# *MultiPASS C3000*

# SERVICE MANUAL

Canon

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### DTP System

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# I. MEANING OF MARKS

The marks used in this manual have the following meanings.

| Mark | Meaning |
|---|---|
| | States a precaution to be taken to prevent danger to personnel, damage to the product, or damage to electronic components by discharge of static electricity. for example. |
| | States a precaution to be taken to prevent damage to electronic components by electrostatic discharge. |
| | Informs you of fire-related cautions. |
| | Informs you that the plug must be removed from the power outlet before starting an operation. |
| NOTE | Gives useful information to understand descriptions. |
| REFERENCE | Indicates sections to be read to obtain more detailed information. |

# II. ABOUT THIS MANUAL

This manual is divided into five parts, and contains information required for servicing the product.

***Part 1: Facsimile***

This section describes the facsimile function of the respective product.

***Part 2: Printer***

This section describes the printer function of the respective product.

Each of the above parts is further divided into the following four chapters:

***Chapter 1: General Description***

This part explains product specifications and the how to service the unit safely. It is very important, so please read it.

***Chapter 2: Technical Reference***

This part explains the technical theory of the product.

***Chapter 3: Maintenance and Service***

This part explains how to maintain the products for adjustment and troubleshooting and service operations and service switches.

***Chapter 4: Appendix***

This part explains the informations of the optional products and user data flow.

**REFERENCE**

- For more details of user operations and user reports, see the separate volume of *USER'S GUIDE*.
- Procedure for assembly/disassembly and greasing points are not given in this manual. See the illustrations in the separate volume of *PARTS CATALOG*.
- Detailed description of each SSSW/parameter is not given in this manual except the new SSSWs/parameters added to this model.
  See *G3 Facsimile Service Data Handbook (supplied separately)* for details them.
- See the *G3 Facsimile Error Code List (Rev.1, supplied separately)* for details of the error codes not shown in this manual.
- Detailed description of connector Locations and Signal Descriptions in not given in this manual.
  See the *Circuit Diagram* for details them.

# III. REVISION HISTORY

| *REVISION* | *CONTENT* |
|---|---|
| 0 | Original |

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# MultiPASS C3000

## Service Manual

*Part 1: Facsimile*

# 1. FEATURES

## 1.1 Overview

This product is a G3 transreceiving facsimile based on the ITU-T recommendation. It can be used in telephone networks.

*: This mark indicates new function.

**Excellent print quality**

The high-performance print head offers 360 × 360 dot per inch (dpi) resolution for text and graphics.

**Automatic switching between fax and voice calls**

Fax/telephone switching allows you to receive fax messages and normal phone calls on a single line.

**BJ cartridge** **REFER TO PAGE 2-20.**

The BC-20 and BC-21 BJ cartridges provide excellent print quality for crisp, clean-looking documents.

**Convenient paper handling**

The paper tray holds up to 100 sheets of plain letter, legal, or A4 paper, and the automatic document feeder can hold up to 20 letter-size, A4-size or 10 legal-size pages.

**Simple maintenance**

The replaceable ink cartridge contains the ink and the print head. When it runs out of ink, simply replace it.

**Ink detection function** **REFER TO PAGE 2-18.**

This model has a new ink detection function. After each received page is printed, ink is ejected in front of a photosensor, so that the machine can detect whether there is ink remaining or not.

# 2. SPECIFICATIONS

## 2.1.General Specification

| | |
|---|---|
| **Type** | Desktop |
| **Body colour** | Art gray |
| **Power source** | 98 ~ 132V AC, 48 ~ 62 Hz, |
| **Power consumption** | standby 6.5W / Max. 47 W (when 100% black copy) |
| **Usage environment.** | 50.0°F ~ 90.5°F (10°C ~ 32.5°C), 20%~85% RH, 532 ~ 760 mmHg (709 ~ 1013 hPa)<br>Horizontal ±3° or less |
| **Operating noise** | Measured in accordance with ISO standards<br>Standby :35 dB(A) or less<br>Operating :47dB(A) or less |
| **Dimensions (W X D X H)** | 15.75" × 14.2" × 7.75" (400 mm × 361 × 197 mm)<br>(Not including Trays) |
| **Weight** | 13.23 lbs (6.0 kg) Including trays |

## 2.2 Communication Specification

| | |
|---|---|
| **Applicable lines** | PSTN (Public Switched Telephone Network)<br>PBX (Private Branch eXchange) |
| **Applicable Services** | DRPD |
| **Handset** | None |
| **Transmission method** | Half-duplex |
| **Transmission control protocol** | ITU-T T30 binary protocol/ECM protocol |
| **Modulation method** | |
| **G3 image signals** | ITU-T V.27ter (2.4k, 4.8k bps)<br>ITU-T V.29 (7.2k, 9.6k bps)<br>ITU-T V.33 (12k, 14.4k bps)<br>ITU-T V.17 (TC7.2k, TC9.6k, 12k, 14.4k bps) |
| **G3 procedure signals** | ITU-T V.21 (No.2) (300bps)<br>(With automatic fallback function) |
| **Coding** | ITU-T T.4 Coding method (MH, MR)<br>ITU-T T.6 Coding method (MMR) |
| **Error correction** | ITU-T T30 (ECM) |
| **Canon express protocol (CEP)** | None |

**Time required for transmission protocol**

| Protocol *1 Mode | Pre-message Protocol *2 | Post-message Protocol *3 (between pages) | Post-message (after pages) |
|---|---|---|---|
| Standard/Fine | approx.12 sec. | approx.4 sec. | approx.3.5 sec. |

*1 Time from when other facsimile is connected to the line until image transmission begins.
*2 Post-message (between pages): Time from after one document has been sent until transmission of the next document starts if several pages are transmitted.
*3 Post-message (after last pages): Time from after image transmission is completed until line is switched from facsimile to telephone.

| | |
|---|---|
| **Minimum transmission time** | 10 msec (MH,MR), 0 msec (MMR) |
| **Transmission output level** | from 0 to -15 dBm |
| **Receive input level** | from -3 to -43 dBm |
| **Modem IC** | R144EFXL |

## 2.3 Scanner Specification

| | | |
|---|---|---|
| **Type** | Sheets | |
| **ADF capacity** | Max. 20 sheets (A4/Letter) | |
| | Max. 10 sheets (Legal) | |
| **Effective scanning width** | Letter/Legal | 8.42" (214 mm) |
| | A4 | 8.19" (208 mm) |
| **Scanning method** | Contact sensor scanning method | |
| **Scanning line density** | | |
| Horizontal: | | 8 dot/mm (203.2 dpi) |
| Vertical: | Standard | 3.85 line/mm (97.79 dpi) |
| | Fine | 7.7 line/mm (195.58 dpi) |
| **Scanning speed** | Binary (200 dpi) | 10 msec./line |
| | Binary (300, 400 dpi) | 5 msec./line |
| | 256 gray scales (200 dpi) | 10 msec./line |
| | 256 gray scales (300, 400 dpi) | 20 msec./line |
| **Scanner gray scales** | 8 bit, 256 gray scales | |
| **TWAIN** | Yes | |
| **Image modes** | Halftone (PHOTO mode) | |
| **Scanning density adjustment** | 3 density level (PC assisted) | |
| **Halftone (fax and copy)** | 64-gradation error diffusion system (UHQ-6.5) | |
| **Prescan** | None | |

## Scanning range

Sheet dimensions (W × L)

| | |
|---|---|
| Maximum | 8.50" × 39.3" (216 mm × 1000 mm) |
| Minimum | 3.5" × 2.5" (88.9 mm × 63.5 mm) |
| Thickness | |
| multiple pages: | 0.002" ~ 0.005" (0.06 mm ~ 0.13 mm) |
| | 40~90 g/m2 |

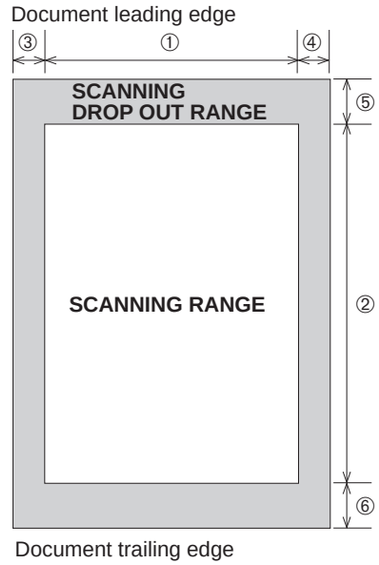



**Figure 1-1 Scanning Range**

| Item | A4 | Letter | Legal |
|---|---|---|---|
| ① Effective scanning width | 8.09"~8.18" (205.5~208 mm) | 8.33"~8.42" (211.5~214 mm) | 8.33"~8.42" (211.5~214 mm) |
| ② Effective scanning length | 11.54" (290.0~296 mm) | 10.84" (272.4~278.4 mm) | 13.84" (348.6~354.6 mm) |
| ③ Left margin | 0.04" ±0.14" (1.0 mm ±3.5 mm) | 0.08" ±0.14" (2.0 mm ±3.5 mm) | 0.08" ±0.14" (2.0 mm ±3.5 mm) |
| ④ Right margin | 0.04" ±0.14" (1.0 mm ±3.5 mm) | 0.04" ±0.14" (1.0 mm ±3.5 mm) | 0.04" ±0.14" (1.0 mm ±3.5 mm) |
| ⑤ Top margin | 0.08" ±0.08" (2.0 mm ±2.0 mm) | 0.08" ±0.08" (2.0 mm ±2.0 mm) | 0.08" ±0.08" (2.0 mm ±2.0 mm) |
| ⑥ Bottom margin | 0.08" ±0.08" (2.0 mm ±2.0 mm) | 0.08" ±0.08" (2.0 mm ±2.0 mm) | 0.08" ±0.08" (2.0 mm ±2.0 mm) |

Units are inches with mm shown in parentheses.

**NOTE**

Document scanning width **"A4/LTR"** is set in service data #1 SSSW SW06, bit4.

## 2.4 Printer Specification

| | |
|---|---|
| **Printing method** | Bubble-jet ink on-demand |
| **BJ Cartridge** | |
| Products name | BC-20 Black BJ cartridge/BC-21 Color BJ cartridge/BC-22 Photo Color BJ cartridge |
| Product code | F45-0561/F45-0571/F45-1141 |
| Print head | 128 nozzles/136 nozzles (Y:24, M:24, C:24, Bk:64)/136 nozzles |
| Ink cartridge (Ink tank) | None/BCI-21 Color or BCI-21 Black/None |
| Valid period | 1 year/half a year (since the seal was opened)/1 year |
| Storage conditions | Temperature 32.0°F ~ 95.0°F (0°C ~ 35°C)<br>Humidity 35% ~ 85% RH |
| **Ink Cartridge** | |
| Products name | BCI-21 Black Ink Cartridge/BCI-21 Color Ink Cartridge |
| Product code | F47-0731/F47-0741 |
| Ink contains | 9 ml/5 ml each of YMC |
| **Ink detection** | Yes (Directly detects ink ejection ) |
| **Printing speed** | Approx. 5 pages/minute (in case of character print) |
| **Printing resolution** | 360 dpi × 360 dpi (Normal print)<br>180 dpi × 180 dpi (Economy print*) |
| *Printing in a checkered pattern without printing vertical and horizontal adjacent dots. | |
| **Paper output tray stacking** | Approx. 50 sheets (when using the recommended paper)<br>Approx. 20 sheets (when raised output guides) |
| **Paper tray** | |
| Paper supply method | ASF (Auto Sheet Feeder) |
| Number of paper tray | 1tray : Legal/Letter/A4 (Universal ) |
| Paper capacity | Max. 0.40" (10 mm) thickness<br>plain paper (Approx. 100 sheets) |
| **Recommended paper** | |
| Canon Copier LTR/LGL Premium Paper | |
| Weight | 75 g/m$^2$ |
| Paper size | Letter, Legal |
| Manufactured by | BOISE CASCADE |
| PLOVER BOND | |
| Weight | 75 g/m$^2$, 90 g/m$^2$ |
| Paper size | Letter |
| Manufactured by | FOX RIVER |
| XEROX 4024 | |
| Weight | 75 g/m$^2$, 90 g/m$^2$ |
| Paper size | Letter, Legal |
| Manufactured by | XEROX |

## Printing range

Paper dimensions (W × L)

| | |
|---|---|
| Letter | 8.50" × 10.98" (216 mm × 279 mm) |
| Legal | 8.50" × 14.02" (216 mm × 356 mm) |
| A4 | 8.27" × 11.69" (210 mm × 297 mm) |

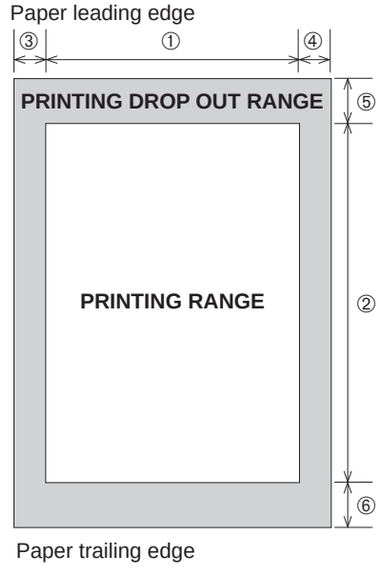



**Figure 1-2 Printing Range**

| Item | A4 | Letter | Legal |
|---|---|---|---|
| ① Effective printing width | 8.00"±0.12" (203.2±3.0" mm) | 8.00"±0.12" (203.2±3.0" mm) | 8.00"±0.12" (203.2±3.0" mm) |
| ② Effective printing length | 11.20" (287±3 mm) | 10.51" (269.4±3 mm) | 13.47" (345.6±3.5 mm) |
| ③ Left margin | 0.13"±0.06" (3.4±1.5 mm) | 0.25"±0.06" (4.9±1.5 mm) | 0.25"±0.06" (4.9±1.5 mm) |
| ④ Right margin | 0.13"±0.06" (3.4±1.5 mm) | 0.25"±0.06" (4.9±1.5 mm) | 0.25"±0.06" (4.9±1.5 mm) |
| ⑤ Top margin | 0.12"±0.06" (3.0±1.5 mm) | 0.12"±0.06" (3.0±1.5 mm) | 0.12"±0.06" (3.0±1.5 mm) |
| ⑥ Bottom margin | 0.27"±0.12" (7.0±3.0 mm) | 0.27"±0.12" (7.0±3.0 mm) | 0.27"±0.12" (7.0±3.0 mm) |

Units are inches with mm shown in parentheses.

**NOTE**

- The header and footer are printed in the printing range.
- The shaded area is included in the left and right margin errors of the paper trailing edge.
- ②, ⑤, ⑥ represent the vertical direction printing drop out range, and printing range 0.71" (18mm) or less.
- The printing range is set in user data **"FAX PRINTER SETTING"**, **"SELECT PAPER SIZE"**.

## 2.5 Copy Specifications

| | | |
|---|---|---|
| **Color copy** | None | |
| **Multiple copy** | 99 copies | |
| **Copy resolution** | | |
| | Scanning | 360 dpi × 360 dpi (direct copy)<br>8 dot/mm × 7.7 line/mm (memory COPY)<br>(UHQ-6 smoothing) |
| | Printing | 360 dpi × 360 dpi |
| **Copy magnification ratio** | 100%, 90%, 80%, 70% | |

## 2.6 Function

| | |
|---|---|
| **Dialling** | |
| Manual dialling | Numeric button |
| Auto dialing | Max. 120 digits<br>One-touch:6, Coded speed:50, Numeric button:1 |
| Group dial | Max.55 locations |
| Redial | Numeric button redial function (Max. 120 digits) |
| **Transmission** | |
| Broadcast transmission | Max. 57 locations (One-touch:6, Coded speed:50, Numeric button:1) |
| Delayed transmission | Yes (PC Assisted) |
| Confidential Tx/Rx | None |
| Relay broadcasting originating | None |
| Relay broadcasting | None |
| **Reception** | |
| Dual Access | Yes |
| FAX/TEL switching | Yes |
| Method | CNG, ROT(Re-Order Tone) detection |
| Message | None |
| Pseudo CI | None |
| Pseudo ring | Yes |
| Pseudo ringback tone | Yes |
| Reduction settings for reception | Yes |
| Automatic reduction of reception images | Yes (100%~70%) |
| Built-in Answering machine | None |
| Answering machine connection | Yes (Telephone answering priority type) |
| Remote reception | Yes (Remote ID method) |
| Memory lock reception | None |
| Reception printing in reverse order | None |
| **Polling** | |
| Polling transmission | None |
| Polling reception | None |

| | |
|---|---|
| **Others** | |
| **Closed network** | None |
| **Direct mail prevention** | None |
| **Reception printing in reverse order** | None |
| **Memory box** | None |
| **Memory backup** | |
| Backup contents | Dial registration data, User data, Service data, Time |
| Backup IC | 256 kbit SRAM for control |
| Backup device | Lithium battery 3.0V DC/560 mAh |
| Battery life | Approx.. 5 years |
| **Image data backup** | None |
| **Activity management** | Yes |
| **a) User report** | |
| Activity management report (Every 20 transactions : always transmission and reception together) | |
| Activity report (sending/receiving) | |
| One-touch speed dialling list | (by SPECIAL MODE) |
| Coded speed dialling list | (by SPECIAL MODE) |
| Group dialling list | (by SPECIAL MODE) |
| Memory clear list | |
| User's data list | (by SPECIAL MODE) |
| Multi activity report | |
| **b) Service report** | |
| System data list | |
| System dump list | |
| Error list | |

| | |
|---|---|
| **Transmitting terminal identification** | Yes |
| **Time** | |
| Management data | Year/month/date/day/hour/minute (24 hour display) |
| Precision | ±30 sec per month |
| **Display** | 1row × 16 digits |
| **Completion stamp** | None |
| **Program key** | None |
| **Telephone exchange function** | None |
| **Speaker phone** | None |
| **Demo print function** | None |
| **HELP function** | None |

# 3. OVERVIEW

## 3.1 External View

### *Front View*

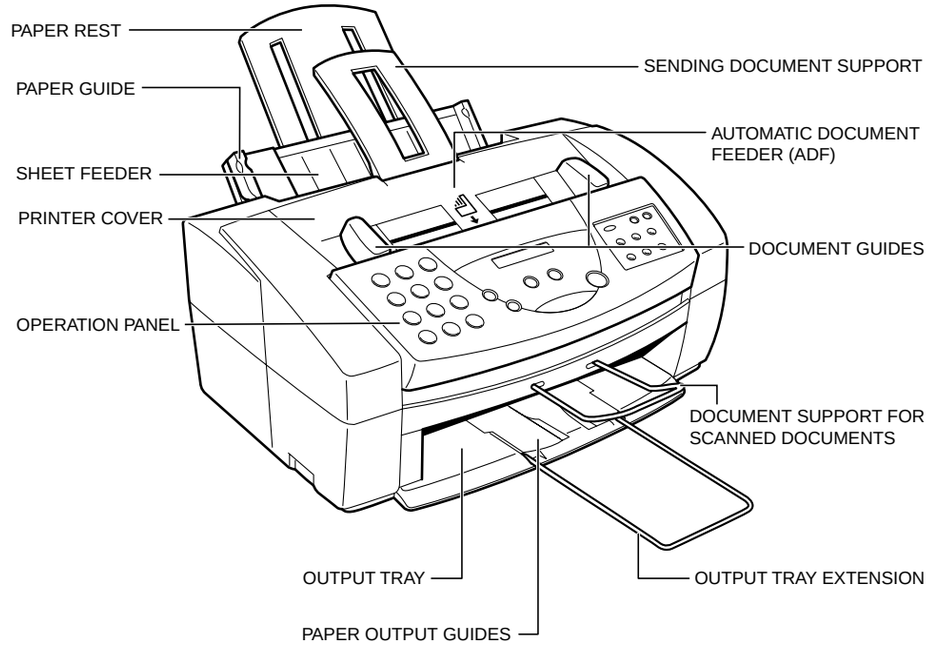
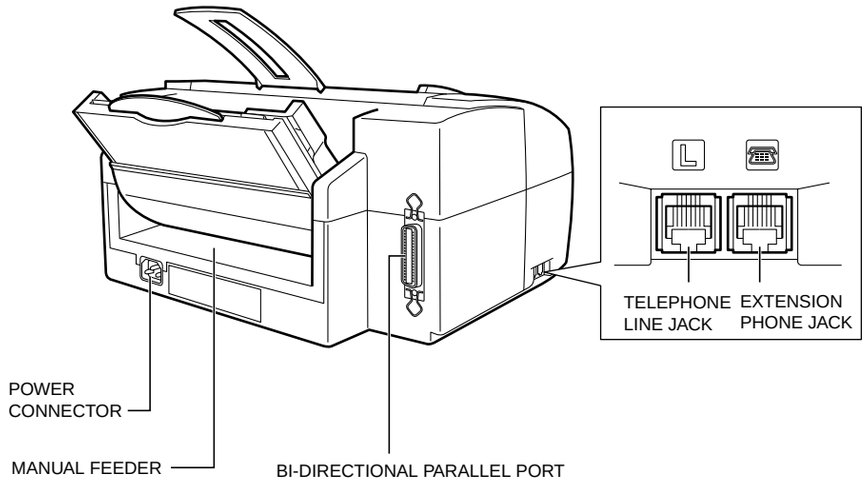



**Figure 1-3 External View (1)**

NOTE

For the switches used for servicing, refer to *Chapter 3: 5.1 Hardware Switches on Page 3-31*.

## Rear View




## Inside the Printer Cover

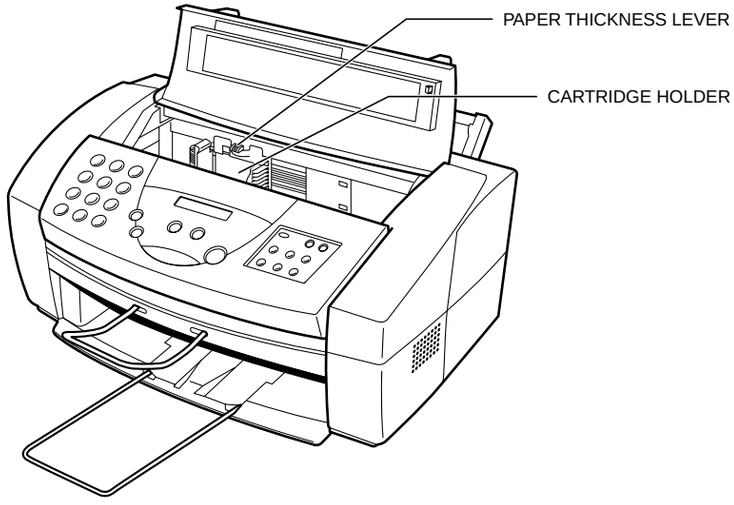



**Figure 1-4 External View (2)**

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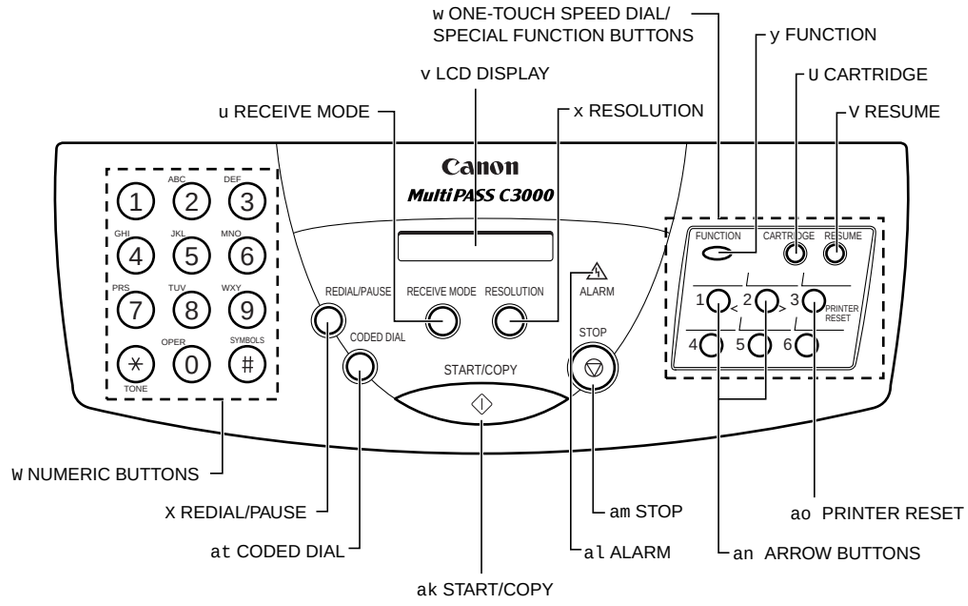
## 3.2 Operation Panel

### *The C3000's Controls — The Operation Panel*




u **RECEIVE MODE button**
Use this button to select whether the C3000 is set to receive faxes manually ("Manual Mode"), to treat all calls as faxes ("Fax Only Mode"), to use an answering machine to receive all calls ("Ans.Machine Mode"), or to automatically switch between telephone and fax receiving, depending on the type of call ("Fax/Tel Mode").

v **LCD display**
This displays messages and prompts during operation, and displays selections, text, numbers, and names when registering information.

w **One-Touch Speed Dial/Special Function buttons**
Use these for one-touch speed dialing, entering user information, printing documents stored in memory, and cleaning the print head.

x **RESOLUTION button**
Press this to select the resolution the C3000 will use for the document you want to fax or scan.

**Figure 1-5 Operation Panel (1)**

y **FUNCTION button**
Use this to enter user information, to run the C3000's self-cleaning process, check the nozzles, or to print faxes stored in the C3000's memory.

U **CARTRIDGE button**
Press this to release the C3000's BJ cartridge holder to its center position for installing or replacing the cartridge. (Press again after installing the cartridge to return the cartridge holder back to its home position.)

V **RESUME button**
Press this when you want to form-feed paper when printing.

W **Numeric buttons**
Use these buttons to type numbers and names when entering information, and to dial fax/telephone numbers that are not registered for automatic dialing.

X **REDIAL/PAUSE button**
Press this to redial the last number that was dialed using the number buttons, or to enter pauses between digits when dialing fax numbers.

at **CODED DIAL button**
Press this button (followed by entering a two-digit code with the number buttons) to dial a fax number that you have registered for coded speed dialing.

ak **START/COPY button**
Press this to begin sending, receiving, scanning, or other operations, or to select functions when registering information.

al **ALARM lamp**
This flashes when an error occurs, when the C3000 is out of paper or ink, or when received faxes are stored in memory.

am **STOP button**
Press this to cancel sending, receiving, or any other operation.

an **Arrow buttons (< >)**
Use these to scroll through menu selections or to move the cursor when registering data.

ao **PRINTER RESET button**
Press this to reset the C3000 if your PC crashes. This will maintain all the faxes currently in memory. Do not unplug the C3000 to reset the unit or the faxes in memory will be lost.

**Figure 1-6 Operation Panel (2)**

### Entering a Name

When entering a name (such as “Unit Name”), each numeric button has a number and a group of uppercase and lowercase letters assigned to it. The chart below shows which number to press for each character.

| Button | Characters |
|---|---|
| 1 | 1 |
| 2 | ABCabc2 |
| 3 | DEFdef3 |
| 4 | GHIghi4 |
| 5 | JKLjkl5 |
| 6 | MNOmno6 |
| 7 | PQRSpqrs7 |
| 8 | TUVtuv8 |
| 9 | WXYZwxyz9 |
| 0 | 0 |
| # | -.*#!”,;:^`_= / | ’?$@%&+()[]{}<> |

**Figure 1-7 Operation Panel (3)**

## 3.3 Consumables

### 3.3.1 BJ cartridge and ink cartridge and BJ cartridge container

## *Choosing the Best Cartridge*

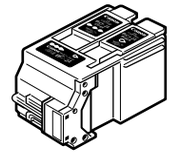
Canon offers several BJ print cartridges and ink tanks for use in the C3000. (BJ print cartridges contain the BJ print head and ink, while BJ ink tanks contain only ink.) Use the following descriptions to decide which type of cartridge best suits your particular needs.

Note

To avoid printing problems, use only the BC-21 BJ cartridge for normal printing (or the separately sold BC-20 Black BJ cartridge, if you rarely print color). The BC-22 Photo Color BJ Cartridge (sold separately) is for printing photo-realistic color images. Other cartridges can produce unsatisfactory results. In addition, use only BCI-21 Black and BCI-21 Color ink tanks in the BC-21 Color BJ cartridge.

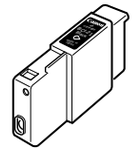
**BC-21 Color BJ Cartridge**

The BC-21 incorporates a BJ print head and two replaceable ink tanks (a BCI-21 Black and a BCI-21 Color). Use this cartridge for normal printing.



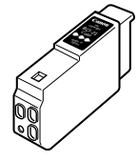
**BCI-21 Black ink tank**

Purchase this ink tank from your local Canon dealer as the black ink runs out of the BC-21 Color BJ cartridge.



**BCI-21 Color ink tank**

Purchase this ink tank from your local Canon dealer as the color ink runs out of the BC-21 Color BJ cartridge.



**BC-20 Black BJ Cartridge**

This cartridge incorporates a BJ print head and black ink in a single unit. The BC-20 can be used if most of your printing is black, e.g. for receiving faxes, making copies, and monochrome printing. It can print twice as fast as a color cartridge, and at higher resolution.

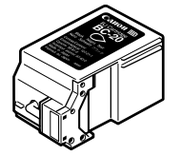
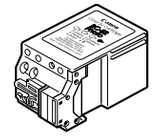


**Figure 1-8 Consumables (1)**

**BC-22 Photo Color BJ Cartridge**

Includes the print head and color ink in a single unit. Use this cartridge for printing photo-realistic color images.

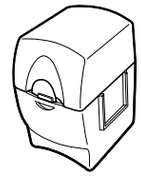


Note

The C3000 cannot print incoming faxes or make copies while the BC-22 cartridge is installed. This is an ink-saving feature: because the BC-22 is a single unit (and does not have ink tanks that can be replaced separately), using it to print faxes will use the black ink faster, using up the cartridge while it still has a considerable amount of color ink remaining.

**SB-21 BJ Cartridge Container**

Use the SB-21 to store an extra BJ cartridge in a convenient location, while keeping it from drying out.



Note

Your C3000 unit comes with a BC-21 Color BJ Cartridge (which incorporates the BCI-21 Black and BCI-21 Color ink tanks) and an additional BCI-21 Black ink tank. When you run out of ink, or if you wish to use any other Canon BJ cartridges mentioned above, you can purchase them from a Canon Official Dealer.

**Figure 1-9 Consumables (2)**

### 3.3.2 Print media

#### *Plain Media*

**Plain paper**

The C3000 produces letter-quality print on most plain bond paper, including cotton bond and photocopy paper. It can use A4, letter, or legal sizes. The paper must be less than 0.008 inch (0.2 mm) thick, and have a weight of 17–24 lbs (64–90 g / $m^2$).

Note

You can also use paper weighing 24–28 lbs (90–105 g / $m^2$) by manually feeding sheets, one at a time.

**Envelopes**

The C3000 can print on U.S. Commercial No. 10 (9.5 x 4.1 inches) and European DL (220 x 110 mm) envelopes.

#### *Canon Media*

Canon provides the following media, all specifically developed to extend the printing capability of your C3000. For details or purchase, contact your local authorized Canon dealer.

**Canon Bubble Jet Paper LC-301 (water resistant)**

This is a water-resistant, letter-size paper specially developed for color printing with Canon Color BJ printers such as the C3000. Images printed on LC-301 paper are bright and vivid, and will not run if liquid is spilled on them. Images printed on this paper stand up to normal office highlighters, unlike images printed on other papers.

**Canon High-Resolution Paper HR-101**

This paper is designed to produce near-photographic quality print output, with sharp, vivid graphics and photographs. You must use this paper when printing with the BC-22 Photo Color BJ Cartridge. When using HR-101 paper, be sure to print on the whiter side of the sheets, and after printing a pack of this paper, use the cleaning sheet provided with it to clean the printer roller.

**Canon Transparencies CF-102**

These letter-size overhead transparencies are specially designed for Canon BJ color printers. Use these clear transparencies to produce crisp and professional overhead presentations. Do not use normal transparencies in the C3000, as they do not absorb ink and can cause the ink to run.

**Canon Back Print Film BF-102**

This unique mylar-based translucent sheet allows you to print high-quality letter-size color output — including photographs and graphics — that you can view with a rear illumination device such as with a light box. This gives you sharp, bright, vivid images you can use in meetings, trade shows, and other presentations.

Note

If you are printing from an application outside Windows, your application or printer driver must support mirror image printing in order to use back print film.

**Figure 1-10 Print Media (1)**

**Canon High-Gloss Film HG-101**

This is a high-grade, letter-size gloss film that lets you create sharper and more vivid color output than is possible with coated paper. This film provides the best color print quality for the BC-21 Color BJ cartridge. Use this film for trade show displays or other special presentations, and when printing at 720 x 360 dpi resolution.

**Fabric Sheets FS-101**

These legal-size, white, cotton fabric sheets are specifically designed for Canon BJ Color printers, and enable you to print your own designs for cross stitch, pillows, holiday stockings, and other craft projects.

**T-Shirt Transfers TR-101**

This special letter-size sheet allows you to print your own designs and transfer them to any cotton or cotton / poly blend t-shirt, sweatshirt, apron, tote bag, or other fabric item.

Be sure to select Back Print Film Option when printing on the TR-101 T-Shirt Transfers. See the *MultiPASS Desktop Manager for Windows® User's Guide* for instructions.

**Figure 1-11 Print Media (2)**

# 4. DIMENSIONS

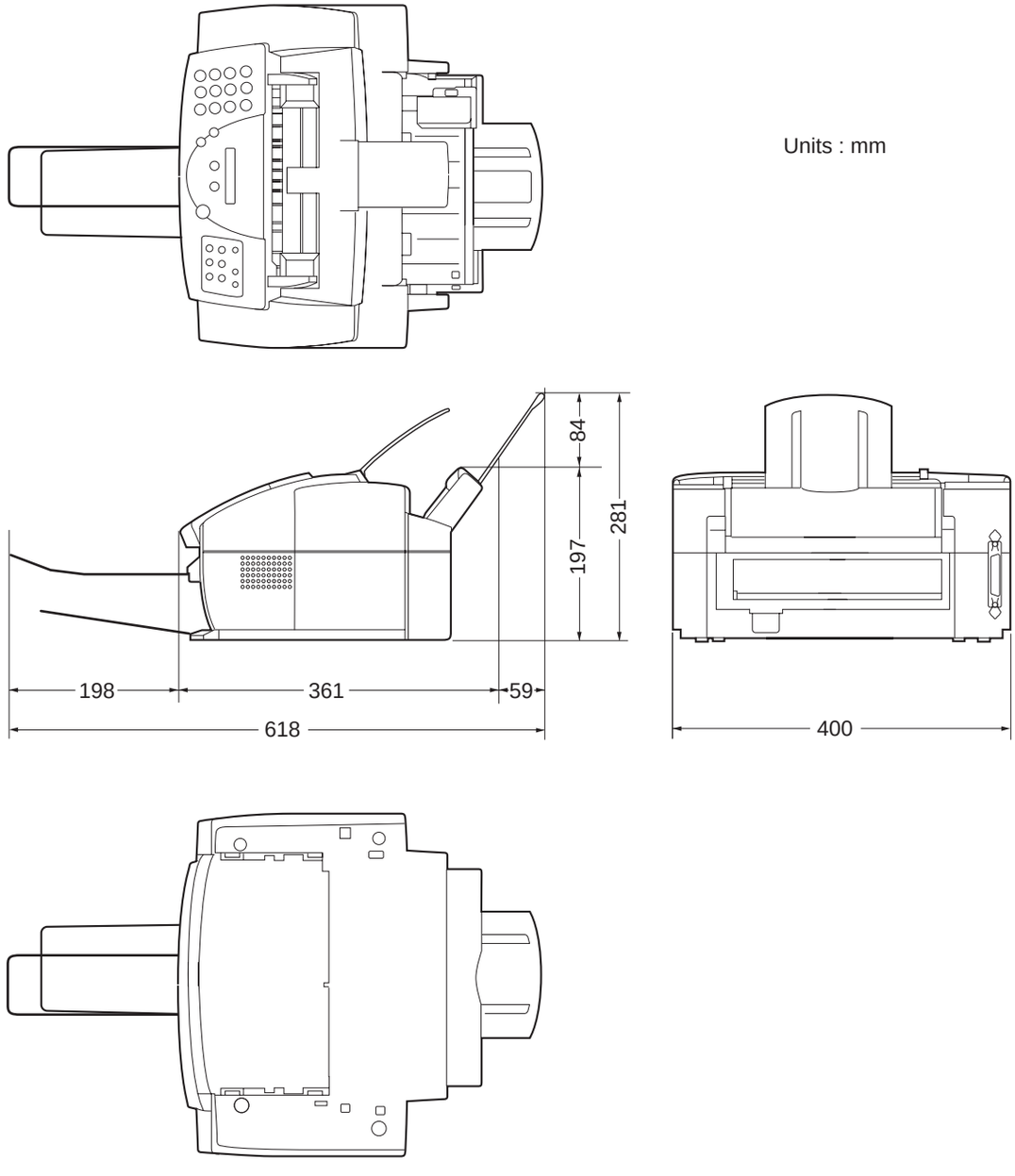



**Figure 1-12 Dimensions**

# 5. SAFETY & PRECAUTIONS

## 5.1 Personnel Hazards

### Electrical Shock and High-Temprature Parts

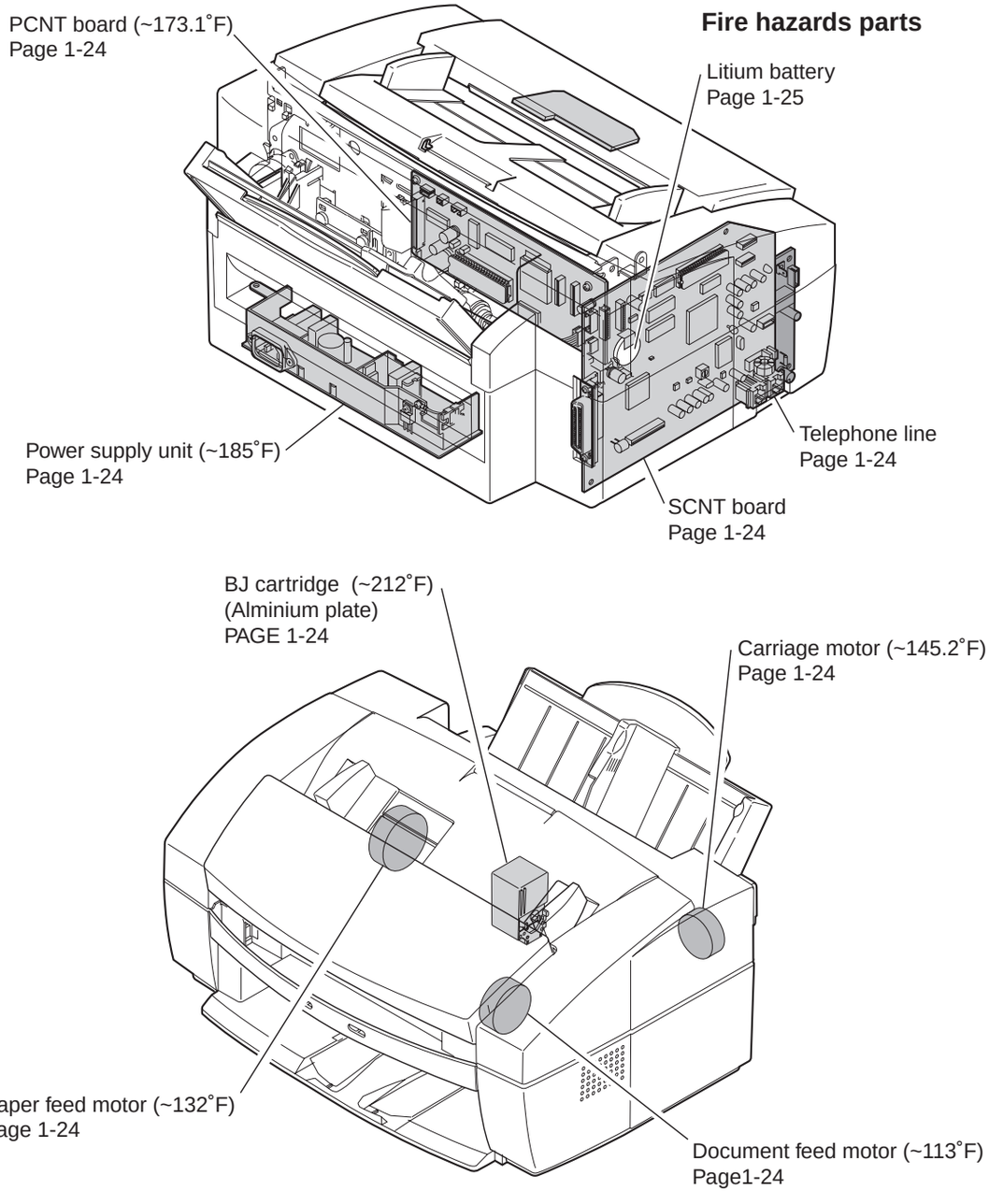
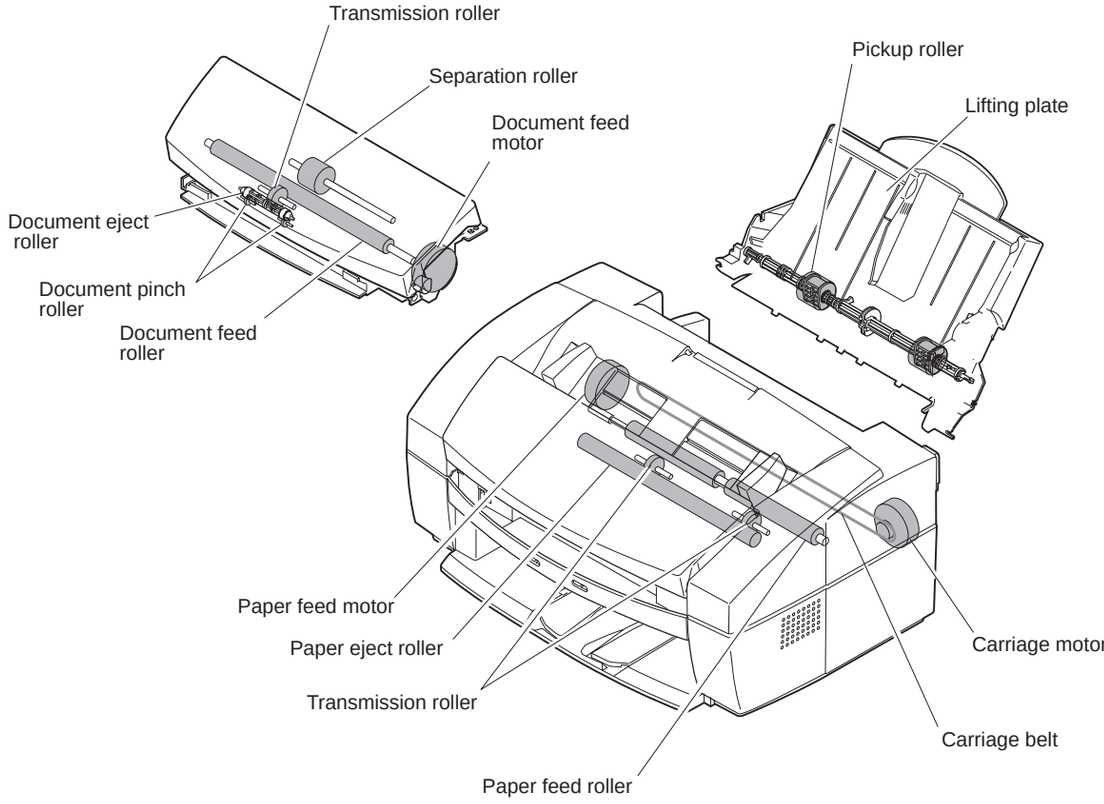



**Figure 1-13 Personnel Hazards (1)**

Moving parts ☞ Page1-25




Preventing ink stains ☞ Page1-25

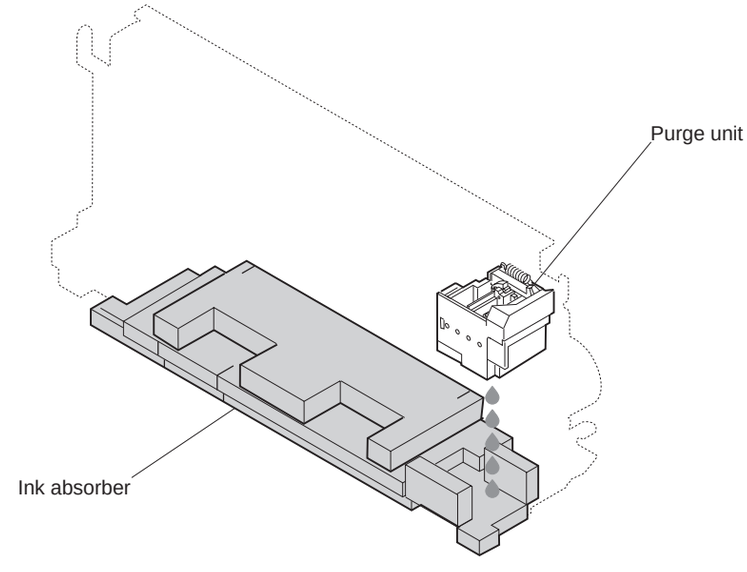



**Figure 1-14 Personnel Hazards (2)**

### 5.1.1 Electrical shock

**Electrical shock hazard**

- To prevent electrical shock, be sure to disconnect the power cord and modular jack before disassembly.
- Remove grounding wrist straps before servicing this unit while the FAX's power is on. Otherwise, electrical shock may occur.

NOTE

**Power supply unit**

When power is supplied to this unit, 120 VAC will be supplied to the primary side.

**Telephone line**

If a telephone line is connected to this unit, 48 VDC will be supplied by this line. When a call signal is received, a voltage of 90 VAC Vrms will be supplied.

### 5.1.2 High-temperature parts

**High-temperature warning**

To prevent skin burns, disconnect the power cord and let this unit stand for at least 10 minutes to allow hot parts to cool.

NOTE

**How to treat burns**

Heat of about 122°F or more causes burns. Also, the longer the contact, the more severe the burn.

When treating a burn, the first minute after receiving the burn is the most important. Cool the burn immediately with cold running water. In case of a serious burn, seek medical attention immediately.

NOTE

The parts which get hot during operation are indicated. For the location of these parts, refer to the figures.

(Ambient temperature 95°F (35°C) continuous copy operation)

Document feed motor (approx. ~ 113.9°F (45.5°C))
Paper feed motor (approx. ~ 132°F (55.6°C))
Carriage motor (approx. ~ 145.2°F (62.9°C))
Power supply unit (Max. ~ 185°F (85.2°C))
PCNT board assembly (approx. ~ 173.1°F (78.4°C))
BJ cartridge (max. ~ 212°F (100°C))

### 5.1.3 Fire hazards

**Do not dispose in fire.**

Do not dispose of lithium batteries in fire. Doing so may rupture the battery and expose flammable materials.

Follow applicable local regulations when disposing of the the SCNT board assembly's lithium battery.

**Fire hazard**

When using IPA or other solvents during servicing, heat or sparks from internal electronic circuits can ignite the solvent. Before using such solvents, be sure to turn off the power source and wait until the high-temperature parts cool. Use the solvent in a well-ventilated area.

### 5.1.4 Moving parts

**Moving parts**

To prevent mishaps due to moving or rotating parts during servicing, be sure to disconnect the power cord before disassembly.

Since the this unit does not have a sensor on the printer cover, the carriage and rollers will not stop even if the printer cover is opened during a printing operation. If the printer cover must be opened during printing, beware of the moving parts.

*Figure 1-14* shows the driving section's location.

### 5.1.5 Preventing ink stains

Avoid touching the BJ cartridge ink nozzles, ink pad, head cap, head wiper, and ink absorbers. The ink can stain your hands, clothes, etc. Although the ink is water soluble, it is permanent and will permanently stain clothing, etc.

**NOTE**

Although the ink is not toxic, it contains an organic solvent (isopropyl alcohol 67-63-0). If the ink enters the eyes accidentally, flush the eyes with running water and see a doctor. If the ink is swallowed accidentally, see a doctor immediately and give the information printed on the BJ cartridge label.

## 5.2 General Cautions
### 5.2.1 Unit cautions

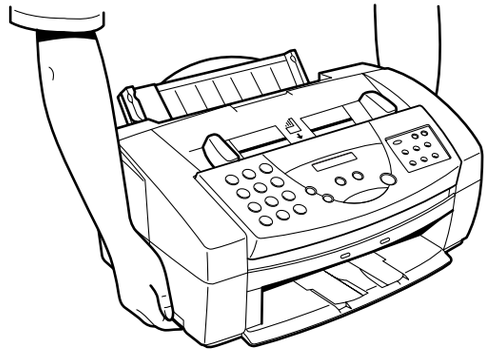
# Safety Instructions

Read these safety instructions thoroughly before using your C3000, and keep them handy in case you need to refer to them later.

Except as specifically described in this manual, do not attempt to service the C3000 yourself. Never attempt to disassemble the unit: opening and removing its interior covers will expose you to dangerous voltages and other risks. For all service, contact your local authorized Canon dealer or service center.

- ❑ Always follow all warnings and instructions marked on the C3000.
- ❑ Use the C3000 only on a sturdy, stable, level surface. If the C3000 falls, it could be seriously damaged.
- ❑ Do not use the C3000 near water. If you spill liquid on or into the unit, unplug it immediately and call your local authorized Canon dealer or service center.
- ❑ The back and bottom of the C3000 include slots and openings for ventilation. To keep the C3000 from overheating (which can cause it to operate abnormally and create risk of fire), take care not to block or cover these openings. Do not operate the unit on a bed, sofa, rug, or other similar soft surface, or near a radiator or other heat source. Do not place the C3000 in a closet or cabinet or on shelves unless adequate ventilation is available. See “Choosing a Location for Your C3000” for guidelines on how much space the unit needs for ventilation.
- ❑ Operate the C3000 only from the type of power source indicated on the unit’s label. If you are not sure of the type of power available from your wall outlets, contact your local power company.
- ❑ The C3000 has a three-prong, grounding-type plug (the third pin is a grounding pin) that fits only into grounding-type outlets. This is a safety feature. If the outlet you intend to use is not the correct type, contact an electrician to replace it: do not use a 3-to-2 adapter, as this defeats the three-pronged plug’s grounding purpose.
- ❑ Make sure the total amperage used by all devices plugged into the wall outlet does not exceed the ampere rating of the outlet’s circuit breaker.

- ❏ Do not allow anything to rest on the power cord or place the C3000 where the cord will be walked on. Make sure the cord is not knotted or kinked.
- ❏ Do not insert objects of any kind into the slots or openings on the C3000's cabinet, as they could touch dangerous voltage points or short out parts, and result in fire or electric shock.
- ❏ Do not allow small objects (such as pins, paper clips, or staples) to fall into the C3000. If something does fall into it, unplug the unit immediately and call your local authorized Canon dealer or service center.
- ❏ Always unplug the C3000 before moving or cleaning it.
- ❏ Whenever you unplug the C3000, wait at least five seconds before you plug it back in.
- ❏ Keep the C3000 away from direct sunlight, as this can damage it. If you have to place it near a window, install heavy curtains or blinds.
- ❏ Do not expose the C3000 to extreme temperature fluctuations. Install the unit in a place with temperatures in the range 50°–90.5°F (10°–32.5°C)
- ❏ Always unplug the C3000 during thunderstorms.
- ❏ Before you transport the C3000, remove its BJ cartridge.
- ❏ Always lift the C3000 as shown below. Never lift it by its sheet feeder or document supports.



- ❑ Unplug the C3000 and contact your local authorized Canon dealer or service center in any of these situations:
  - If the power cord or plug is damaged or frayed.
  - If liquid spills into the unit, or if it is otherwise exposed to rain or liquids.
  - If you notice smoke or unusual noises or odors coming from it.
  - If the C3000 does not operate normally when you follow the operating instructions. Adjust only those controls that are covered by the operating instructions in this manual, or you can damage the unit and require extensive repair work.
  - If the C3000 is dropped or its cabinet damaged.
  - If the C3000 begins performing poorly, and you cannot correct the problem by using the procedures in Chapter 6, "Troubleshooting."
- ❑ FCC rules governing the use of fax equipment require that you register your fax number, your name or company name, and the date and time in the C3000 before using it. For instructions, see "Entering User Information in the C3000".

# Choosing a Location for Your C3000

Before unpacking your C3000, follow these guidelines to choose the best location for it.

Please review the information provided in "Safety Instructions", to make sure you are installing your C3000 for safe use.

- ❑ Put the C3000 in a cool, dry, clean, well ventilated place:
  - Make sure the area is free from dust.
  - Make sure the location is not affected by extreme temperature changes, and always stays between 50° and 90.5°F (10° and 32.5°C).
  - Make sure the area's relative humidity is always between 10% and 90%.
- ❑ Keep the C3000 away from direct sunlight.
- ❑ If possible, put the C3000 near an existing telephone outlet, to avoid the expense of installing a new one.
- ❑ Place the C3000 near an electrical wall outlet that accepts a three-prong, grounded plug, and that provides 120-volt AC (60 Hz) power. (This is standard for U.S. outlets; if you have any doubts, contact an electrician to check the power for you.)
- ❑ Place the C3000 near the PC you will be connecting it to. Make sure you can reach it easily, as you will be using it as a printer, fax machine, copier, scanner, and telephone.
- ❑ Do not plug the C3000 into the same circuit as an appliance such as an air conditioner, electric typewriter, television, or copier. Such devices generate electrical noise that can interfere with your C3000's ability to send or receive faxes.
- ❑ Set the C3000 on a flat, stable, vibration-free surface that is strong enough to carry its weight (about 13 lbs / 6.0 kg).
- ❑ Make sure the location you choose provides enough space around the C3000 for adequate ventilation, and to allow paper to flow freely into and out of the unit. The figure below shows the minimum space required for the unit.

# Powering Up

Follow these guidelines when connecting your C3000 to a power source:

- ❑ The C3000 is intended for use in the U.S. and Canada only and requires 120 VAC. Do not use it outside the U.S. or Canada.
- ❑ Plug the C3000 only into a 120-volt AC, 60-Hz, three-prong grounded outlet.
- ❑ Use only the power cord that came with the unit. Using a longer cord or extension cord can cause the C3000 to malfunction.
- ❑ Unplug the unit only by pulling on the plug itself. Never pull on the cord.
- ❑ Do not plug the C3000 into an outlet shared with an appliance such as an air conditioner, computer, electric typewriter, or copier. These devices generate electrical noise, which can interfere with the C3000's operation.
- ❑ Make sure nothing is laying on the power cord, and that the cord cannot be walked on or tripped over.
- ❑ Do not overload the electrical outlet. Make sure the total amperage used by all the machines plugged into the outlet does not exceed the ampere rating of the outlet's circuit breaker.

### 5.2.2 BJ cartridge cautions

#### a) General cautions

## *Guidelines for Using and Maintaining BJ Cartridges*

The most important thing you can do to ensure the best possible print quality, as well as extend the life of your C3000, is to take care of the C3000's BJ cartridges following these guidelines:

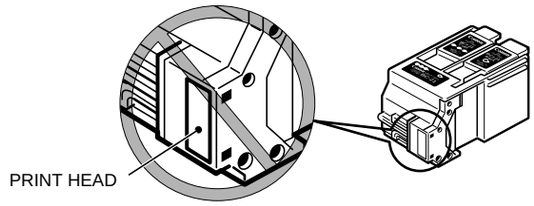
- ❑ Store cartridges at room temperature.
- ❑ Keep cartridges in their sealed containers until you are ready to use them.
- ❑ Install the cartridge immediately after removing its print head cap and protective tape.
- ❑ Always use the cartridge within one year of unpacking it.
- ❑ When changing cartridges, always store the unused cartridge in the SB-21 BJ cartridge container that comes with the C3000.
- ❑ Do not remove the cartridge from the C3000 unless necessary.

The ink in the BJ cartridges is difficult to clean up if spilled. To avoid spilling ink, always be sure to follow these precautions when handling the cartridges:

- Do not attempt to disassemble or refill the cartridge.
- Do not shake or drop the cartridge, or tip the print head downward.
- Keep BJ cartridges out of children's reach.

**Caution**

Hold the BJ cartridge by its sides only. Do not touch the print head, the sharp edges around the print head, the silver plate on the bottom of the cartridge, or the silver metal or circuit area on its side.




- ❑ Make sure the BJ cartridge holder is in its home position (at the right side of the unit) when you are not using the C3000. If it is not in its home position, press the **CARTRIDGE** button. Leaving it out of its home position will dry out the print head on the cartridge.
- ❑ Clean the print head when print quality is no longer satisfactory. See "Cleaning and Testing the BJ Cartridge Print Head" for instructions. If the print quality does not improve after five consecutive cleanings, replace the ink tank or BJ cartridge.
- ❑ Do not use a BC-21 Color BJ cartridge with either of its ink tanks missing. Doing so can cause it to clog.
- ❑ Do not remove the ink tanks from the BC-21 Color BJ cartridge unnecessarily, or the ink in them may clog.
- ❑ Never attempt to refill an empty cartridge.

# Maintaining BJ Cartridges

One of the most important elements in maintaining your C3000's excellent print quality is to clean the BJ cartridge's print head regularly, and to replace the BJ ink cartridges and tanks promptly when needed.

## Cleaning and Testing the BJ Cartridge Print Head

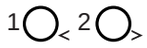
The print head in the BJ print cartridge contains nozzles through which ink is propelled onto the paper. To maintain the best possible print quality, these nozzles need to be cleaned from time to time. Your C3000 is equipped with a print head cleaning function that does this.

If your printouts become faint or streaked, or if their quality otherwise decreases, clean the print head as described below.

If your printing is faded, you can often correct the problem by adjusting the print density (contrast) and printing speed. (For instructions, see the *MultiPASS Desktop Manager for Windows® User's Guide*.) Try this before cleaning the print head.

Cleaning the print head uses a small amount of ink. Cleaning too often significantly reduces the amount of ink in the cartridge, so clean only when necessary.

1. Make sure the C3000 is plugged in.
2. Press **FUNCTION**, then <.




```
FUNCTION
```

3. Press < or > until CLEANING is displayed.

```
CLEANING
```

4. Press **START/COPY**.

- ❑ The C3000 beeps once when cleaning is finished, and returns to Standby mode.

5. Check whether cleaning corrected the problem by printing or

5. Check whether cleaning corrected the problem by printing or copying a document.
6. If necessary, repeat this procedure up to four more times (giving five cleanings in all). If the problem persists after this, install a new BJ cartridge. See “Replacing the BJ Cartridge”.

## When to Replace the BJ Cartridge

How frequently you need to replace your C3000’s BJ cartridge or one of its ink tanks depends on how you use your C3000. If you print a good deal of graphics, halftones, or grayscales, you will need to replace the cartridge more often than if you print mainly text. (See pages A-4 and A-5 for details on the life expectancy of BJ cartridges.)

To help ensure the maximum life for your cartridges, always follow the guidelines for cartridge maintenance given in “Guidelines for Using and Maintaining BJ Cartridges”.

In general, you will need to replace the BJ cartridge in the following situations:

- ❏ If you have been using a BC-21 Color BJ cartridge for over six months or the BC-20 Black BJ cartridge for over a year.
- ❏ If your printed output is not crisp and clear or has gaps in the characters (missing dots), even after you have cleaned the print head five times as described above.
- ❏ If your color printouts appear to be missing a color, even after you have cleaned the print head five times as described above.

In addition:

- ❑ If you are using the BC-21 Color BJ cartridge and your output is blank, one of the ink tanks is probably empty and needs to be replaced. Print the NOZZLE CHECK test pattern to check whether the BJ cartridge needs replacing or not.
- ❑ If the message CHANGE CARTRIDGE appears in the LCD display, the BJ cartridge may have run out of ink. This message also appears if the C3000 has to store a fax in its memory because the cartridge is out of ink.

  If this message appears, do the following:

1. Press **START/COPY** to print any faxes in memory.
   - If the printout appears normal, you do not need to replace the BJ cartridge. (Sometimes cleaning the print head or re-installing the cartridge will clear up the problem.)
   - If the print is light or shows gaps, go to step 2.
2. If there was no fax in memory, or if the fax's print was light, blank, or showed gaps, print or copy a document to make sure the problem is not with the machine that sent the fax.
3. If the document is light, blank, or shows gaps, clean the printing area. If this doesn't work, replace the cartridge.

Although Canon makes numerous BJ cartridges, the BC-21 Color BJ cartridge, the BC-20 Black BJ cartridge, and the BC-22 Color Photo BJ cartridge are designed specifically for Canon's color BJ printers, and are the only ones Canon recommends.

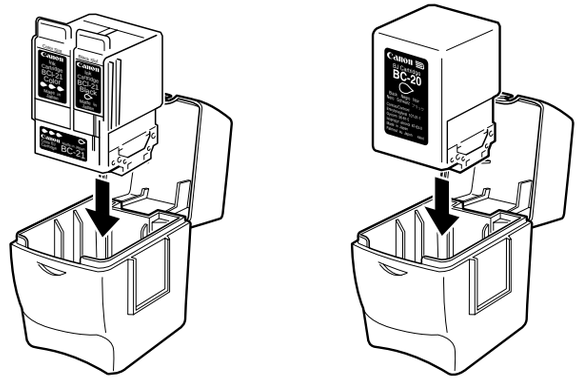
Also, the BCI-21 Color and BCI-21 Black ink tanks are designed specifically for the BC-21 Color BJ cartridge, and are the only ones Canon recommends for the BC-21.

## Storing BJ Cartridges

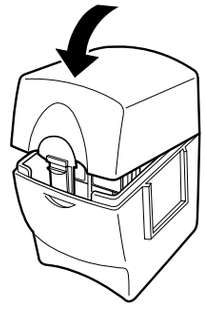
Once a BJ cartridge is unwrapped, its print head must be kept from drying out, or it can clog and fail to work properly. A cartridge installed in the C3000 is protected from drying out by automatically moving to the home position at the right side of the unit and capping itself.

If you remove a partially used BJ cartridge from the C3000, store it in the SB-21 BJ cartridge container that came with your unit.

1. Insert the cartridge in the container with the cartridge's label facing forward, and the print head down.



2. Close the container lid, and snap it shut.



IB2-32

**b) Unpacking the BJ cartridge**

Do not open the BJ cartridge packaging unless you are ready to install the new BJ cartridge. Before installing the BJ cartridge, gently remove the orange head cap and the orange protective tape from the nozzles.

NOTE

**Storing an opened BJ cartridge**

If the BJ cartridge packaging has been opened and the BJ cartridge is not to be installed immediately, store the cartridge in the SB-21 cartridge container, to prevent the printing head from drying out and clogging.

As much as possible, do not open the packaging until the BJ cartridge is to be installed immediately.

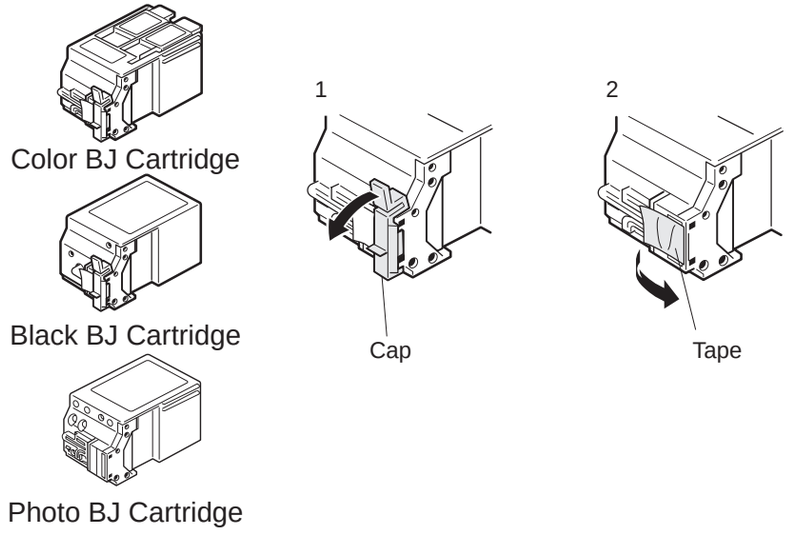



**Figure 1-15 Unpacking the BJ Cartridge**

**c) Protecting the ink nozzles**

Do not touch or wipe the ink nozzles with tissue paper, etc. Doing so can clog the nozzles. If the head cap and protective tape have been removed and the BJ cartridge is not to be installed immediately, store the cartridge properly to prevent the nozzles from drying out and clogging.

Do not disassemble the BJ cartridge. Also, the BJ cartridge contains electronic circuitry. Do not wash it with water.

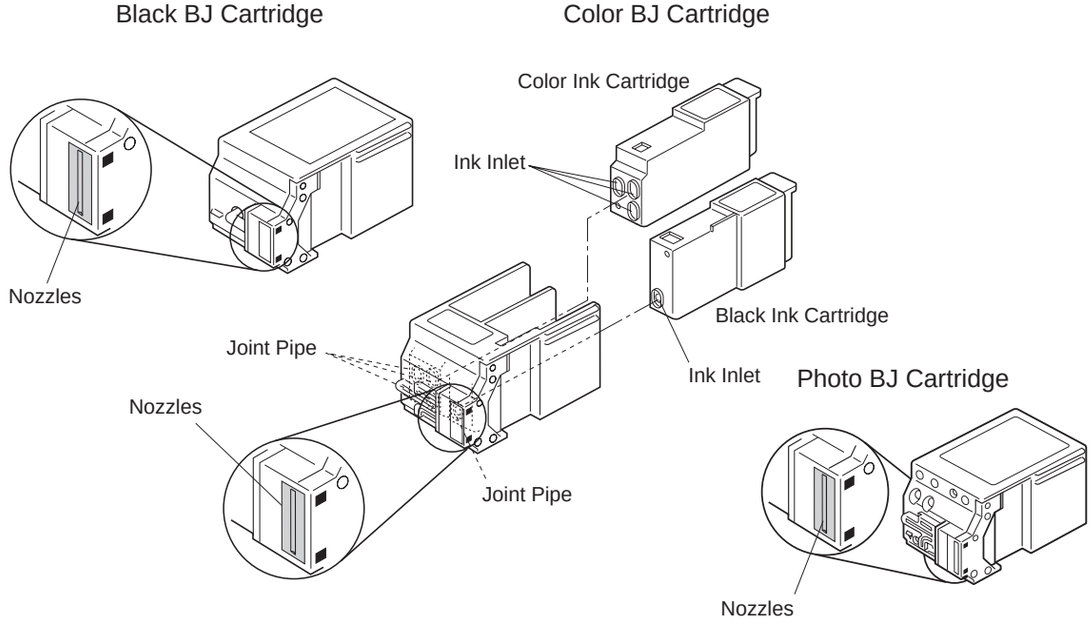



**Figure 1-16 Ink Path Cartridge**

**d) Ink conductivity**

The BJ cartridge ink can conduct electricity. If ink has leaked onto any mechanical parts, wipe off with a damp paper towel. If ink has leaked onto the circuit board, use tissue paper and carefully wipe off the ink completely even at the base of the IC chips.

Never turn on the power while ink still remains on the circuit board. Doing so may damage the circuits.

### 5.2.3 Ink cartridge cautions

#### a) General cautions

Refer to *a) General cautions on Page 1-26*.

#### b) Unpacking the ink cartridge

Do not open the ink cartridge packaging unless you are ready to install the new ink cartridge. Before installing it in the BJ cartridge, remove the protective cap from the ink inlet.

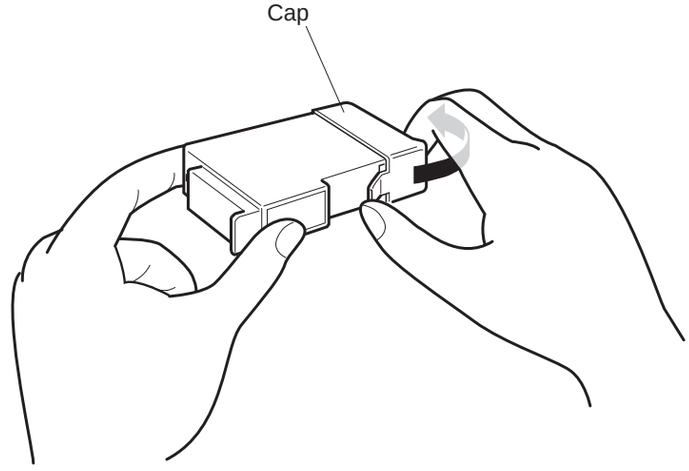



**Figure 1-17 Removing Cartridge Cap**

**c) Preventing ink clogging**

Do not touch the ink cartridge's ink outlets. Doing so may introduce foreign matter into the printing head's joint pipes, causing poor ink suction. After removing the cap from the ink cartridge, immediately install the ink cartridge in the printing head to prevent the ink at the nozzles from drying out and clogging. Do not remove the ink cartridge except when it is to be replaced.

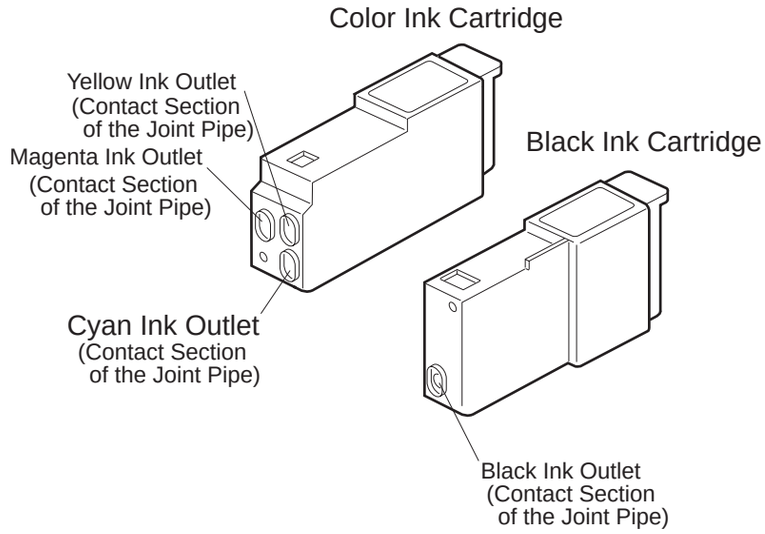



**Figure 1-18 Ink Outlet**

**NOTE**

If the ink nozzles are clogged or if the ink suction is poor, the printout may have horizontal white stripes. If the cleaning operation does not restore it to normal, replace the BJ cartridge.

## 5.3 Servicing Cautions

### 5.3.1 Damage from static charge

This unit contains contact sensors and printed circuit boards equipped with ROM, RAM, custom chips, etc. These electronic components are susceptible to damage caused by static charge.

When disassembling this unit, take care to prevent static charge.

**Static electricity**

Static charge can damage electronic components or alter their electrical characteristics. Even plastic tools and hands without grounding wrist straps can generate damaging static charge.

The following items are required to prevent static charge:

- A grounded, conductive mat
- Grounding wrist straps
- A cord with alligator clips to ground this unit's metal chassis

If you do not have any of the above on hand (during on-site servicing), follow the alternate measures below:

- Use a grounding bag to store and transport printed circuit boards and electronic devices.
- Avoid wearing silk or polyester clothing and leather-soled shoes. Wear cotton clothing and rubber-soled shoes instead.
- Avoid servicing this unit in a carpeted room.
- Before servicing this unit, touch this unit's grounded terminals to discharge any static charge.
- Wear grounding wrist straps and ground this unit's metal chassis.
- Always handle the circuit boards and devices along their edges. Do not touch the components and terminals with your fingers.

**Shock hazard during power on**

If servicing must be performed while this unit is turned on, do not wear any grounding wrist straps. This is to prevent electricity from passing through your body.

### 5.3.2 Scanner unit

#### a) General Precautions

- Handle contact sensors with care to prevent scratching or smudging of the scanning surface. Scratches or smudges can cause vertical stripes, etc., to appear on the scanned image.
- Be careful not to scratch the ADF rollers. If the rollers are scratched, paper jams may result.

### 5.3.3 Print assembly

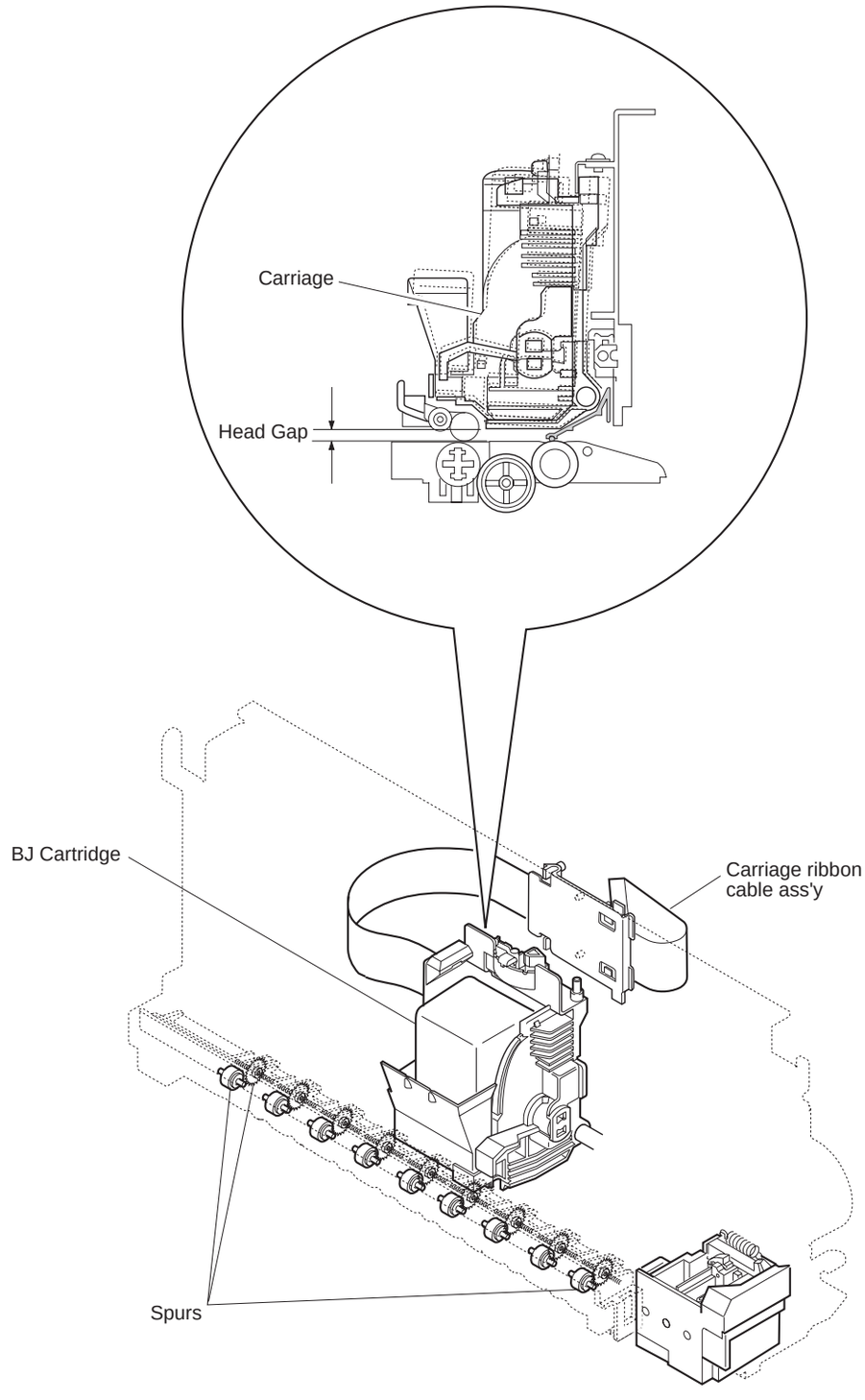



**Figure 1-19 Print Assembly Precautions**

### a) General precautions

#### Head gap

The head gap is the distance between the BJ head and the platen. It has been factory-adjusted. If the carriage guide frame fastened to the printer frame is repositioned, the head gap must be adjusted. This may affect the printing quality.

REFERENCE

If the printing quality has degraded due to a change in the head gap, see *Chapter 3: 3.3 Head Gap Adjustment on Page 3-10* to adjust the head gap.

#### Lubrication points

Do not touch the greased parts of the carriage guide frame, carriage shaft, idler roller and some parts. Doing so will wipe off the grease which has been applied for the smooth operation of the printer unit.

NOTE

Do not apply grease to any unspecified parts and surfaces. If grease is on the purge section's rubber cap or the wiping assembly's blade, it may cause the BJ cartridge's nozzles to clog, rendering the BJ cartridge unusable. Also, do not use any grease other than the specified type. Using a different type of grease may dissolve or deform plastic parts.

REFERENCE

If you accidentally touch a greased surface, reapply the grease. See the *PARTS CATALOG* (provided separately).

#### Spurs

During servicing, be careful not to damage or deform the spur assembly's spur tips. If the spur tips are deformed, the area of the paper coming into contact after the printing increases, causing vertical black stripes on the paper.

#### Carriage ribbon cable assembly

Do not pull or bend the carriage ribbon cable more than is necessary. Doing so may disrupt the cable's continuity and prevent the printing signals to be sent properly to the cartridge.

#### Power off during printing

During servicing, do not disconnect the power cord during a printing operation or while the cartridge is being replaced. Otherwise, the cartridge will stop at a position where the ink nozzles cannot be protected by the rubber cap. The ink may then dry and clog the nozzles. During servicing, be sure the cartridge is properly positioned for nozzle capping.

## 5.3.4 Paper feed section

### a) General precautions

#### Setting the paper size

For fax operations, the user sets the paper size with the MultiPASS Desktop Manager for Windows. The unit cannot detect the paper size automatically. Therefore, if the paper size is altered during servicing, be sure to set it back to the user's paper size setting.

If the paper size setting does not match the size of the paper installed. One of the following two operations will be executed:

(A) If the paper size setting is the same or smaller than the actual size of the paper installed, the following will be executed:
The document will be printed to fit the length of the paper size that has been set.
Even if the paper size setting is smaller than the actual paper size, printing will be executed and no error will result. Depending on the document, large blank areas may result on the printout.

(B) If the paper size setting is larger than the actual paper size, the following will be executed:
As with (A), the document will be printed to fit the length of the paper size that has been set. Since the actual paper size is shorter than the paper size setting, the document's contents would be broken up to fit the paper size setting. **"CHECK PAPER"** will therefore be displayed and printing will be canceled.

## 5.3.5 Control boards

### a) Hardware switch and adjustable volume

- The SCNT board's volume resistor VR1 has been factory-adjusted. Service personnel are not to alter its setting.
- The power supply unit's adjustable volume VR101 has been factory-adjusted. Service personnel are not to alter its setting.

REFERENCE

Regarding the hardware switch for servicing, refer to *Chapter 3: 5.1 Hardware Switches on Page 3-31.*

### b) Replacing the SCNT board

The SCNT board stores the user data, service data, and other data. Therefore, when replacing the SCNT board, print out the stored data and then enter this data into the new SCNT board.

REFERENCE

The SCNT board replacement precaution is described in *"5.4.4 SCNT board replacement precautions" on Page 1-51.*

**(C) Replacing the PCNT board**

The PCNT board stores the absorption amount of waste ink absorber and vertical alignment data. Therefore, when replacing the PCNT board, print out the absorption amount data and then enter this data into the new PCNT board, and then adjust vertical alignment.

## 5.3.6 Opening the upper cover

**How to open the upper cover**

Unless the correct procedure is followed when removing the upper cover , the outer covers may be damaged, and the plastic claws may be broken. Be sure to use the correct tools for the job. If any of the outer covers are damaged during the work, they must be replaced with new ones.

To remove the upper cover, prise loose the four tabs, using the tip of the recommended tool. When loosing these tabs, be careful of the following points.

- Use a tool whose diameter is less than that of the holes. (hole: 3mm × 1.5mm)
  Using larger diameter tools may damage the surface around the holes.
- Be careful not to cause any damage around the holes.
- Do not insert the tool any further than 8mm, otherwise the claws may be damaged.
- When loosing the claws, press down on the upper cover, insert the tool, and when the claw is loose, raise the upper cover. The tabs will be difficult to remove if the cover is lifted up first.

NOTE

The cover opener (round-tip screwdriver) has been set as a special tool, but any precision screwdriver with a tip diameter of 1.5 mm or less would do instead. If using a substitute, be careful not to scratch any surfaces.

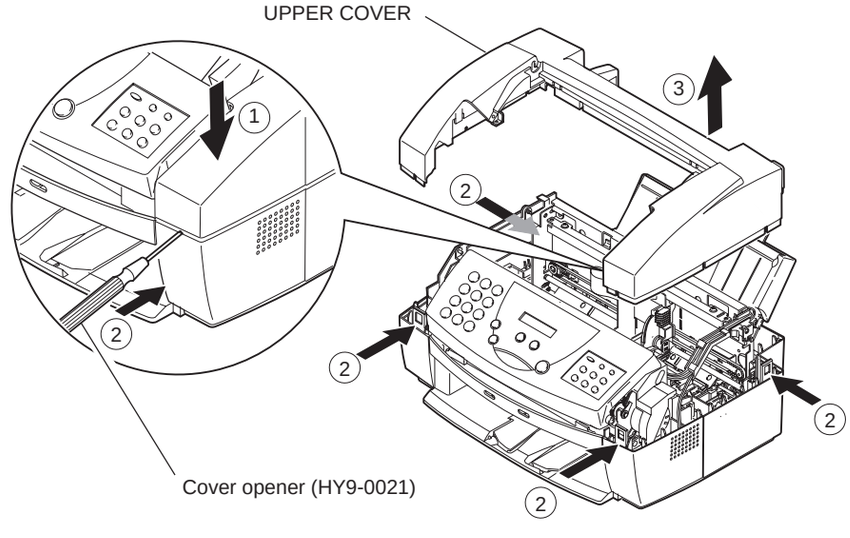



**Figure 1-20 Opening the upper cover**

## 5.4 Data-related precautions

The memory IC on the circuit board stores the user's registration data and values for various counters, etc., required for servicing. Although this data is normally retained in memory, it can be deleted by mistake. When handling this data during servicing, note the following precautions.

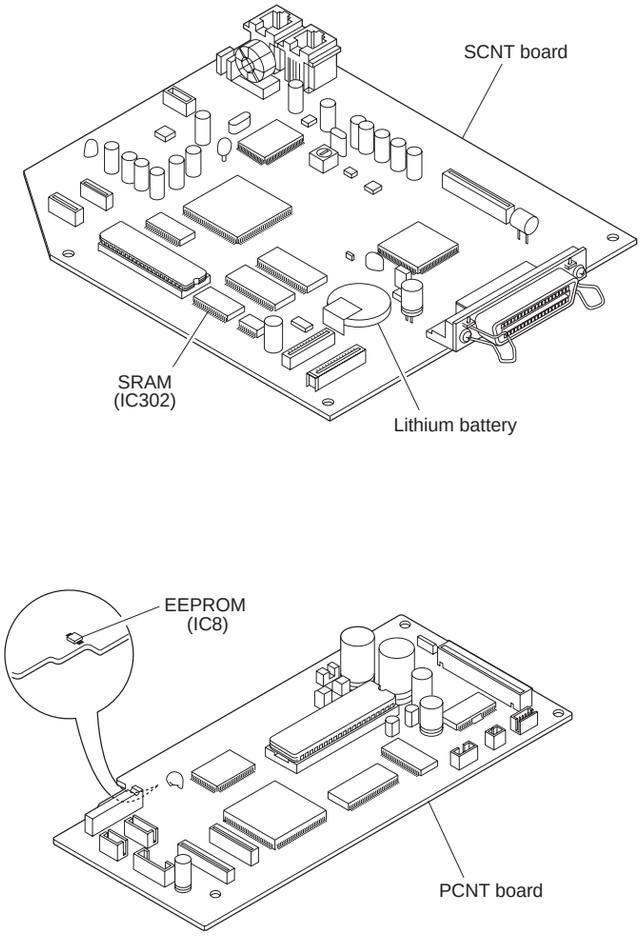



**Figure 1-21 Memory IC and Backed up Devices**

NOTE

**PC registration function**

Using the MultiPASS Desktop Manager that comes with this product, the user setting items stored in the SRAM can be reprogrammed. The contents of these items are stored as necessary in the settings files in the PC, and at the same time are rewritten into the user setting items in the SRAM, via bi-centronics interface. This function means that, when replacing the lithium battery, or performing repairs that normally entail the loss of data, if the user's PC contains valid settings files, there is no need to reenter user managed data. Refer to the MultiPASS Desktop Manager User's Guide for details of this function. However, please note that service data are not saved.

### 5.4.1 Data in the image storage memory (DRAM)

DRAM stores image data which was read other than by a direct transmission. It also acts as a buffer memory to store the image data received. If power is turned off, the memory clear list is printed automatically the next time the power is turned on. The user is thereby notified of the images that were erased from memory.

NOTE

**Reception image data**

This product is not equipped with image data backup, so that if the power supply is cut, data in memory reception will be lost.

When image data are set to be printed, they will be stored in the DRAM as memory reception images, and "**REC'D IN MEMORY**" will be displayed. This product does not have a memory reception image transfer capability. If printing is disabled due to a fault in the printing section, check the Memory Clear List, after turning off the power to repair the fault, and request the other party to retransmit the message.

If the setting is for the received image data to be transferred to PC, instead of being printed, the data will be saved as a file in the DRAM, and "**RECEIVED IN FILE**" will be displayed. To print the contents from the main unit only, select **FILE PRINT** with the numeric keys. If printing is disabled due to a fault in the printing section, connect to the PC, and start up MultiPASS Desktop Manager. The file will be exported to the PC, and the contents can be verified on the PC display and saved.

### 5.4.2 Data in the control processing memory (SRAM)

SRAM is backed up by a lithium battery. It can retain the stored data for 5 years after the power is turned off. SRAM stores the following data: All the data the user entered with the menu system, the activity reports and other report-generating data, the redial data containing the redial destinations set with the Redial key, the servicing data set by repair personnel with the service soft switch, and the factory-entered shading correction data for contact sensor reading correction. SRAM stores almost all of the data which can be entered or set.

These stored data can be checked with various reports.

NOTE

**Jumper plug precautions**

The control/image processing memory is backed up by shorting the jumper pin (JP13) on the SCNT board with the jumper plug. If the the jumper plug is removed and the power is turned off, the data in SRAM will be lost.

Before removing the jumper plug, be sure to print out the data stored in the SRAM.

NOTE

**Lithium battery life**

The lithium battery can last for over 5 years after the power is turned off.

When the power is on, the lithium battery's power is untapped. Therefore, the actual battery life can be much longer.

When the lithium battery becomes exhausted, **"DATA ERROR"** will be displayed after the power is turned off or on. When this happens, replace the lithium battery. Since the data in SRAM will be lost when the battery is replaced, it cannot be printed out.

After the lithium battery is replaced and the power is turned on, **"DATA ERROR"** will be displayed. Press the **START/COPY** key to discard the contents in SRAM and initialize it to the factory defaults.

These messages indicates that the shading correction data for contact sensor reading correction has been lost. Refer to *Chapter 3: 3.1 Shading Data Adjustment on Page 3-6* to re-enter the shading data.

### 5.4.3 Data in the EEPROM

The EEPROM stores the absorption amounts of the waste ink absorber and vertical alignment data. The non-volatile EEPROM does not require any electrical power to retain the data it contains.

Calculation of the total waste ink amount of the waste ink absorber starts immediately after the printer is used. When the absorption amount of the waste ink absorber reaches 100 percent, the waste ink full error is generated and the printing operation is stopped to prevent the waste ink from leaking out.

The vertical alignment data is for correcting any vertical misalignment during bi-directional printing.

The data in the EEPROM can be checked or altered.

REFERENCE

**Checking or altering the data in EEPROM**

**Waste ink absorption amount:**

To check the amount, use the service report's System Dump List. For details, see *Chapter 3: a-2) System dump list on Page 3-62*.

To enter the amount, use the service data #7 PRINTER 3. INK ABS CAPA. For details, see *Chapter 3: 5.2.5 New SSSW's/parameters added to this model on Page 3-41*.

**Vertical alignment data:**

To adjust the vertical alignment, see *Chapter 3: 3.2 Vertical Alignment Correction on Page 3-7*.

**Re-entering the waste ink absorber's ink absorption amount.**

The amount data is calculated one waste ink absorber. The waste ink absorption amount displayed in the **SYSTEM DUMP LIST** indicates the percentage of the respective absorber's maximum capacity that has been reached. The percentage can be indicated and entered in 1% increments. When the waste ink generated immediately after the printer is used reaches 100 percent of the waste ink absorber's capacity, a waste ink full error is generated for each absorber and the printing operation is stopped. Therefore when replacing the PCNT board, be sure to check the current absorption amount and enter it in the new PCNT board.

If the PCNT board assembly malfunctions and the current waste ink absorption amount cannot be checked, replace the ink absorber and set the waste ink absorption amount to 0%. To replace the ink absorber, see *e) New error codes and recovery methods on Page 3-24*.

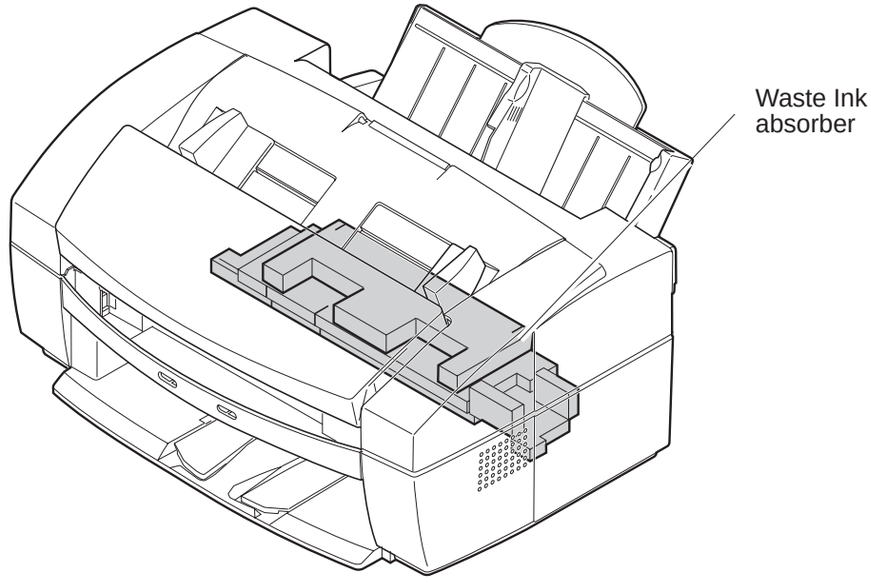



**Figure 1-22 Waste Ink Absorber**

### 5.4.4 SCNT board replacement precautions

Before replacing the SCNT board, print out all of the stored data.

The reports which output the data that must be entered into the new SCNT board is listed below.

**User report**

- **One-touch speed dialing list**
- **Coded speed dialing list**
- **Group dialing list**
- **User data list**
- **Send/Receive Activity report**

**Service report**

- **System data list**
- **System dump list**

REFERENCE

To printout these reports, see *Chapter 3: 7. SERVICE REPORT on Page 3-57*.
To PC registration function, see *Page 1-46*.

The serviceable SCNT board does not have a jumper plug. This is to prevent the lithium battery power from draining. Use the jumper plug on the old SCNT board.

After the new SCNT board is installed and the power is turned on, **"DATA ERROR"** will be displayed. Press the **START/COPY** key to discard the SRAM's irregular contents and initialize it to the factory defaults.
Refer to *Chapter 3: 3. ADJUSTMENT on Page 3-6* to enter the shading data and to adjust the vertical line alignment.

Then refer to the report that was printed out beforehand and enter the various data.

### 5.4.5 Data initialization through service operation

All the data can be initialized with the service data #8 clear operation.

REFERENCE

For details on the initialization procedure and the data that is erased, see *Chapter 3: 5.2 Service Data Setting on Page 3-31*.

NOTE

**"All clear" when nothing works.**

On a rare occasion, the display may go blank and all the buttons may stop working. Severe electrical noise and static can cause problems as well. In such a case, use the **"All clear"** feature.

After installing the unit for the first time and connecting the power cord, execute **"All clear."** The procedure is described below.

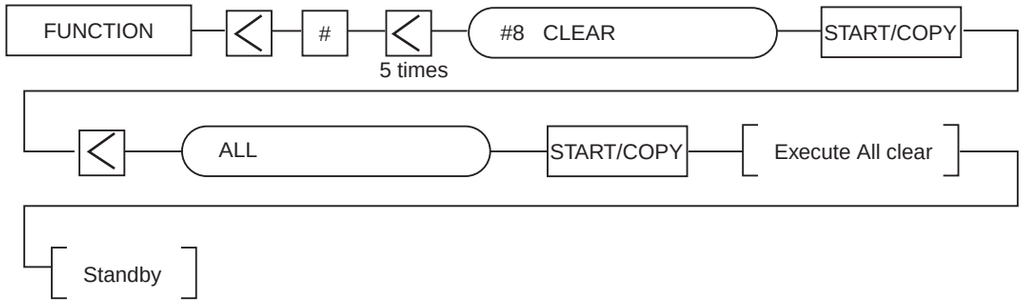



**Figure 1-23 All Clear**

The All clear operation initializes the user data and service data settings. The shading data are not initialized.

After All clear has been executed, make a copy in the **PHOTO** mode and check the image. If the image contains black spots, it is evidence of shading data damage. See *Page 3-6* to re-enter the shading data.

## 5.5 Protective Mechanism

### 5.5.1 Data battery backup function

If there is a power outage or if the power is turned off, the data stored in the control memory is retained since the lithium battery function as a data battery backup.

REFERENCE

For details on the backed up data, see *Chapter 1: 5.4 Data related precautions on Page 1-46*.

### 5.5.2 BJ cartridge maintenance features

#### a) Cleaning

To maintain high printing quality, the fax unit has a cleaning feature that wipes off dust from the BJ cartridge nozzles with a head wiper and fills the nozzles with fresh ink.

#### b) Nozzle capping

The fax unit caps the BJ cartridge nozzles with the Capping section cap after the carriage returns to the front of the Capping section on the right side. This protects the nozzles from dust and prevents the ink from drying out or leaking.

#### c) Maintenance jet

The fax unit has a maintenance jet feature which purges ink from all the ink cartridge nozzles to the purge unit. This prevents the nozzles from clogging and ensures high printing quality.

### 5.5.3 Heat protection mechanism

The BJ cartridge head's aluminum panel becomes hot during printing. It also gets hot if printing continues even after the ink in the cartridge has been depleted. The aluminum panel's temperature is detected by the BJ cartridge's head temperature sensor.

- **When the carriage is to be moved to the cartridge replacement position, the following applies:**

  If the detected temperature exceeds 50°C, **"WAIT COOLING"** is displayed and the carriage does not move. This is to prevent the user from touching the BJ cartridge's aluminum panel. After several minutes when the temperature decreases, the cartridge replacement procedure must be executed again.
- **When a temperature exceeding the standard temperature is detected, the following applies:**

  During printing, the printing head temperature is monitored every 50 ms. If the printing head temperature exceeds 75°C, a 3.5-second wait period is inserted after each printed line for 20 seconds. This is to allow the printing head to cool. After 20 seconds, the head temperature is checked. If the temperature has dropped below 75°C, normal printing resumes without any wait period inserted. However, if the head temperature is still above 75°C, the wait period is inserted after each printed line until the printing head cools sufficiently.

If a head temperature exceeding 100°C is detected for 0.2 sec. during printing, it will be deemed as a BJ head abnormal temperature error and **"CHECK PRINTER ##336"** will be displayed. The printing operation will also stop.

If a head temperature exceeding 100°C is detected for 1 sec. during printing, it will be deemed as a BJ head temperature sensor error and **"CHECK PRINTER ##337"** will be displayed. The printing operation will also stop.

### 5.5.4 Overcurrent protection

The fax unit has an overcurrent protection circuit with a built-in fuse to prevent an abnormal temperature increase if an overcurrent flows to the motors and power supply due to a driver IC problem, software lockup, or short circuiting.

| Protected Component | Safety Device |
|---|---|
| Document feed motor | IC protector (FU3) on PCNT board |
| Paper feed motor | IC protector (FU1) on PCNT board |
| Carriage motor | IC protector (FU2) on PCNT board |
| Power supply unit | Glass-tube current fuse (125V, 4A), overcurrent protection circuit |

### 5.5.5 Lightning protection

The fax unit's electrical components are protected from abnormal voltage caused by lightning.

| Protected Component | Safety Device |
|---|---|
| SCNT board assembly | Arrestors (ZD2) on the primary side of the SCNT board NCU discharges a voltage over 320 to 480 VDC via the power cord |

NOTE

**When protection is not possible**

The SCNT board may not be adequately protected even with the protection circuits if lightning strikes the telephone line.

### 5.5.6 Power leakage protection

The AC line, telephone line, and metal parts of the fax unit are completely insulated. The fax unit has a grounded power cord (three-prong plug) to prevent electrical shock. If power leakage does occur, use the fax unit only with a grounded electrical outlet supplying the proper voltage.

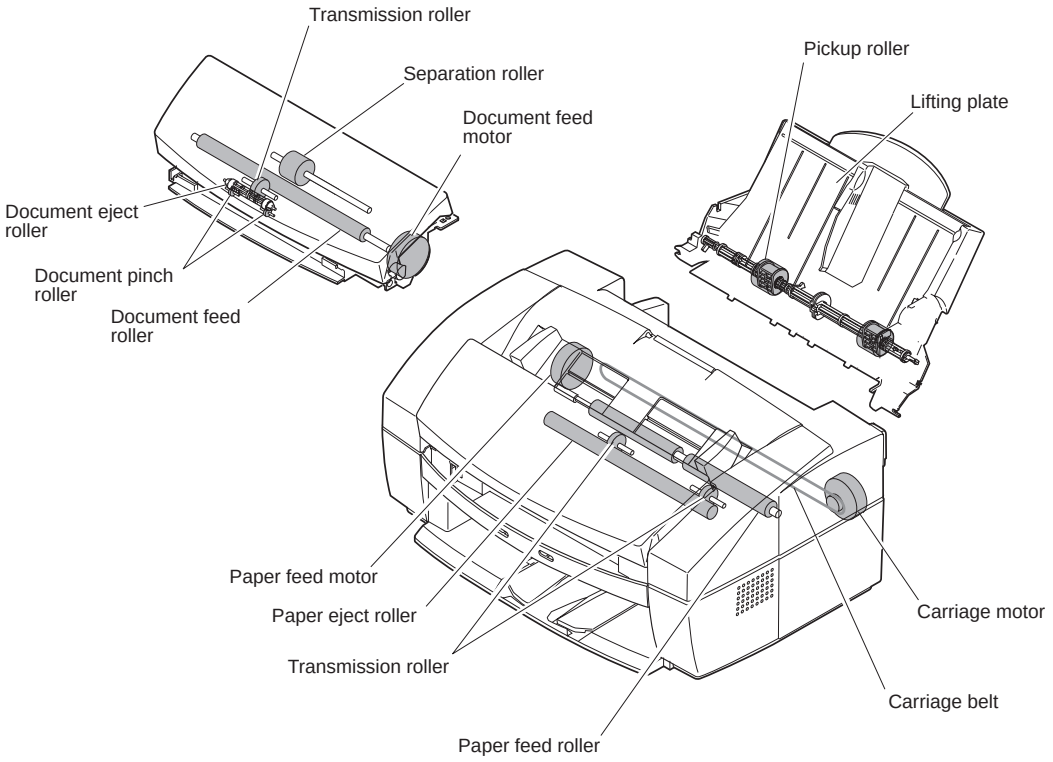
# 6. QUALIFICATION REQUIRED FOR INSTALLATION WORK

The qualifications for installation must satisfy local laws and regulations.

# 1. COMPONENT LAYOUT

The mechanism is composed of the Document Feed Section, which separates pages from a stack of documents and feeds them in one at a time to the Scanning section; the Paper Supply Section, which supplies separated paper or special paper to the Printer Section, and ejects them to the paper tray after printing; and the Printer Section, which performs cleaning of the BJ head, and printing to paper.

For details on each Section of the mechanism, see the sections below, beginning with *2. SCANNER MECHANISM on Page 2-3*.



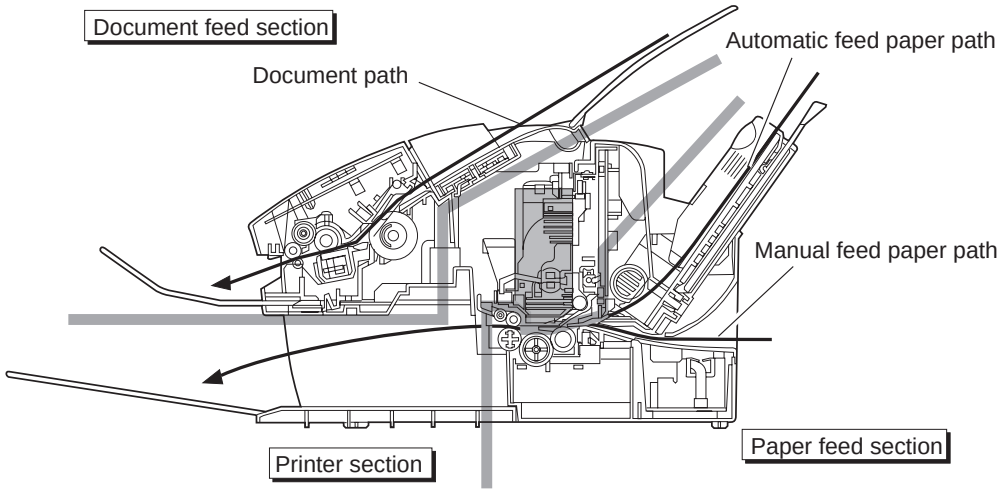




**Figure 2-1 Mechanical Layout**

The electrical section is composed of the following: the SCNT board, which performs system control; the NCU board, which is the interface with the telephone circuit; PCNT board; which performs BJ printer control; the power supply unit; and the OPCNT board, which detects key operations and displays status information. There are also 6 sensors to detect system status.

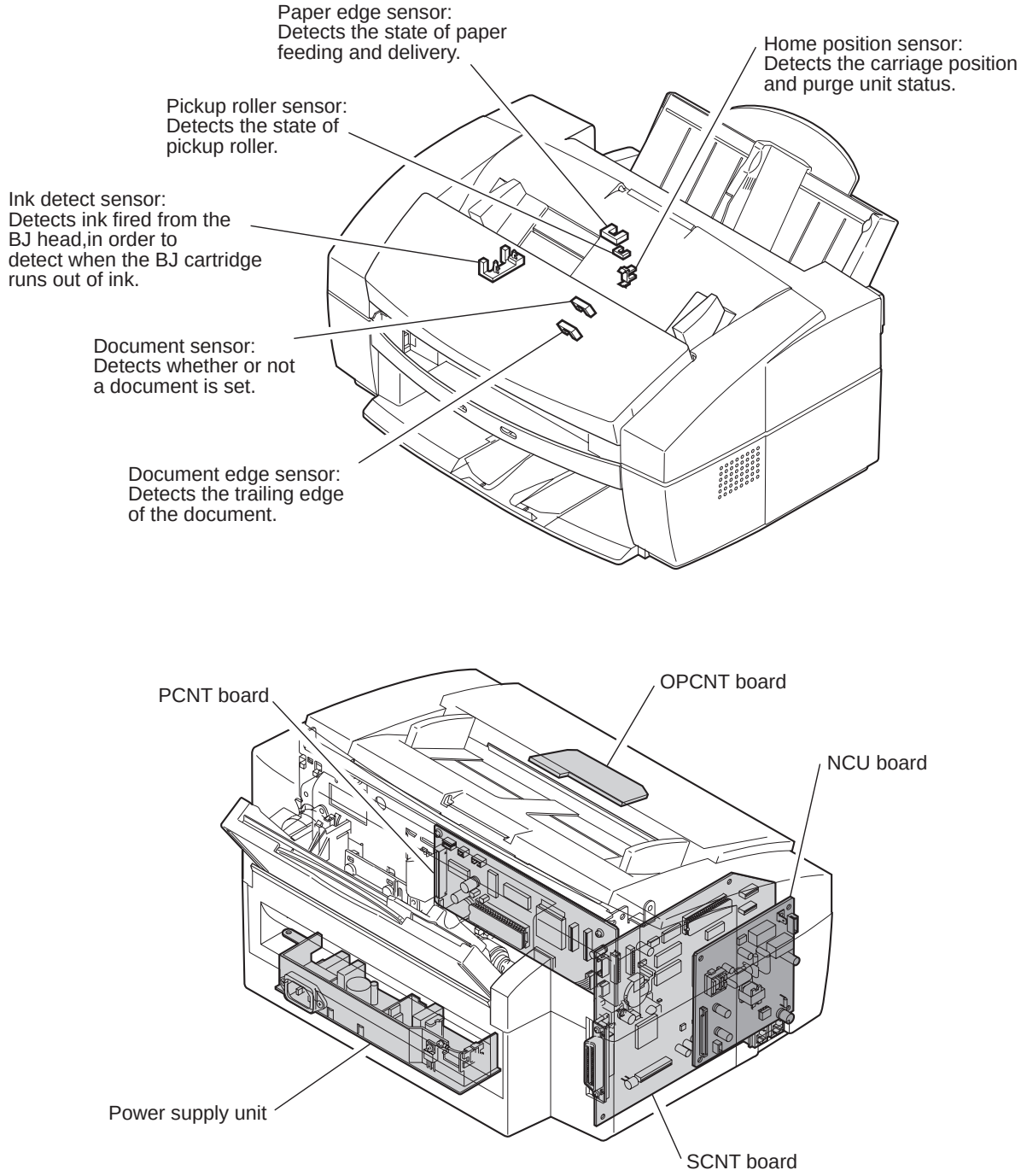

Paper edge sensor:
Detects the state of paper feeding and delivery.
Home position sensor:
Detects the carriage position and purge unit status.
Pickup roller sensor:
Detects the state of pickup roller.
Ink detect sensor:
Detects ink fired from the BJ head,in order to detect when the BJ cartridge runs out of ink.
Document sensor:
Detects whether or not a document is set.
Document edge sensor:
Detects the trailing edge of the document.
PCNT board
OPCNT board
NCU board
Power supply unit
SCNT board

**Figure 2-2 Electrical System Layout**

# 2. SCANNER MECHANISM

The structure of this model's Document Feed Section is based to a large extent on that of the MultiPASS C2500.

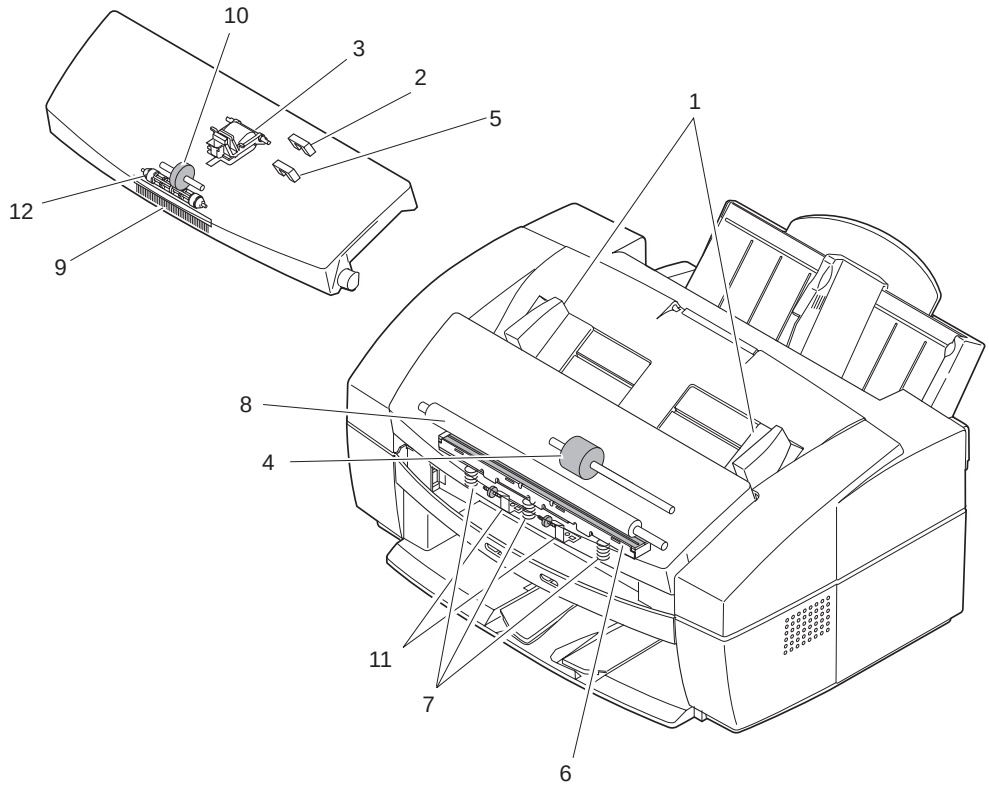



**Figure 2-3 Document Feed Section**

**Names and Functions of Parts**

**1. Paper Guide**

When properly adjusted to the width of the documents, the guide will hold the documents in the horizontal direction to prevent them from skewing when fed.

**2. Document Sensor (DS)**

This sensor uses an actuator to detect the presence of documents to be scan, and sends that information to the SCNT board by way of the gate array in the operation panel unit.

**3. Separation Guide**

Separates the documents to prevent double feeding.

**4. Separation Roller**

Takes documents which were separated at point ①, and delivers them, one sheet at a time, to the Contact Sensor.

**5. Document Edge Sensor (DES)**

Using an actuator, the DES detects the edge of a document just before the Contact Sensor, and sends this information on to the SCNT board.

**6. Contact Sensor** **→ See Page 2-6.**

Scans the image information from the document, converts it to serial data, and transmits it to the SCNT board as an electrical signal.

**7. Springs**

Force the Contact Sensor upwards to press the document closely between the Contact Sensor and Document Feed Roller.

**8. Document Feed Roller**

Delivers and ejects the documents, keeping it pressed closely against the glass surface of the Contact Sensor so that it can be scanned clearly.

**9. Static Eliminator brush**

Removes static electricity which may have built up on the document in the scanning process, and guards against roller jams.

**10. Transmission roller**

The document feed roller revolution is transferred to the document eject roller.

**11. Document eject rollers**

The paper carried from the document feed roller is ejected into the recording paper tray. These rollers are driven by the transmission roller.

**12. Document pinch roller**

Holds the document between the document eject rollers, and then ejects it.

**NOTE**

**Fundamentals of document separation**

The separation of documents is accomplished by the difference in friction coefficients at point ① in *Figure 2-4*. The relationship between the friction coefficients is given by the equation.

(friction coefficient between the original and the separation roller) > (friction coefficient between the original and the friction pad) > (friction coefficient between the originals)

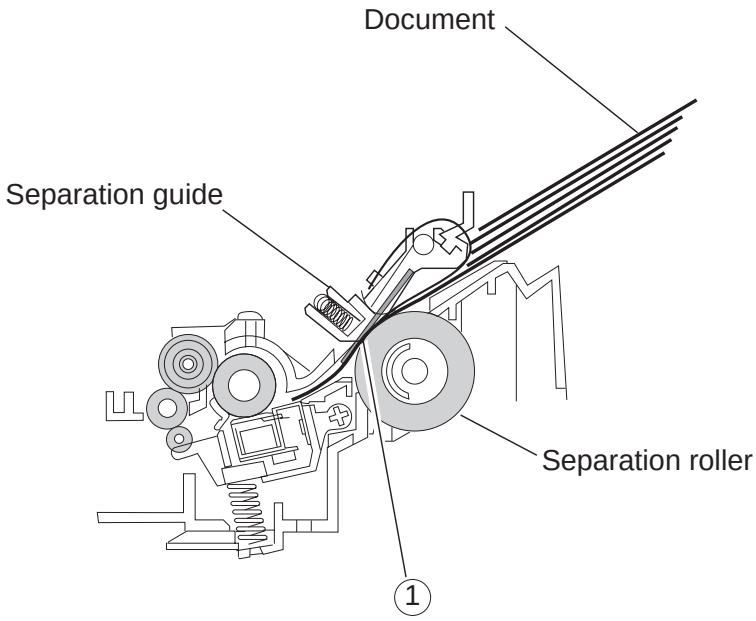



**Figure 2-4 Document Separation**

NOTE

**Document Jam Detection**

There are two types of document jams which may occur.

**a) Feed jam**

Occurs when the leading edge of the original is not detected by the Document Edge Sensor within 15 seconds after the start of document separation.

**b) Eject jam/document too long**

Occurs when the document is fed for one meter or more after the detection of the document's leading edge, without detecting the document's trailing edge.

When one of these types of jams occurs, all data which have been read and stored in memory (which are not part of a page that has already been completely transmitted or copied) are erased.

NOTE

**Contact Sensor**

The Contact Sensor used in the Document Feed Section scans Letter-width 8.43" (214 mm), documents at a horizontal resolution of 8 dots/mm (203.2 dpi).

Resolution in the vertical direction may be selected by the *RESOLUTION* button on the operation panel. Resolution is 3.85 lines/mm (97.8 lpi) in Standard mode and 7.7 lines/mm (195.6 lpi) in Fine mode (for fax transmission).

For copying, the read resolution is automatically set to following.

Direct copy : 360 dpi × 360 dpi

Memory copy : 8 dot/mm × 7.7 line/mm

The structure of the Contact Sensor is shown in *Figure 2-5*. Light from the two LED cells, located at either end of the Contact Sensor, is directed by the optical guide, gathered by the lens, and used to illuminate the surface of the document. Light reflected back from the document surface is captured by 1728 amorphous silicon photosensor chips. The captured light is amplified as an analog signal, and sent as serial data to the System controller IC on the SCNT board.

The System control IC (include UHQ 6.5 unit) on the SCNT board performs image processing (halftone) in order to cleanly transmit image documents.

NOTE

**Shading Correction**

To compensate for variations in Contact Sensor output, this model has shading correction data stored in its control SRAM and image processing SRAM, when shipped from the factory. Thus, it does not perform a prescan of each page, as performed by previous models. Conformity of the shading data is maintained by comparing the data between the two previously mentioned SRAM blocks before reading each page. If for some reason, there is an error in the shading data, the message **"DATA ERROR"** will be displayed to indicate the shading data error. In this case, the shading correction data constant from the image processing IC SRAM is used.

When using the constant from the image processing IC SRAM, there is a possibility of black spots appearing when in Auto Halftone Mode. When this type of image defect occurs, try re-registering the shading data.

REFERENCE

For details on the shading data re-registration process, please see *Page 3-6*.

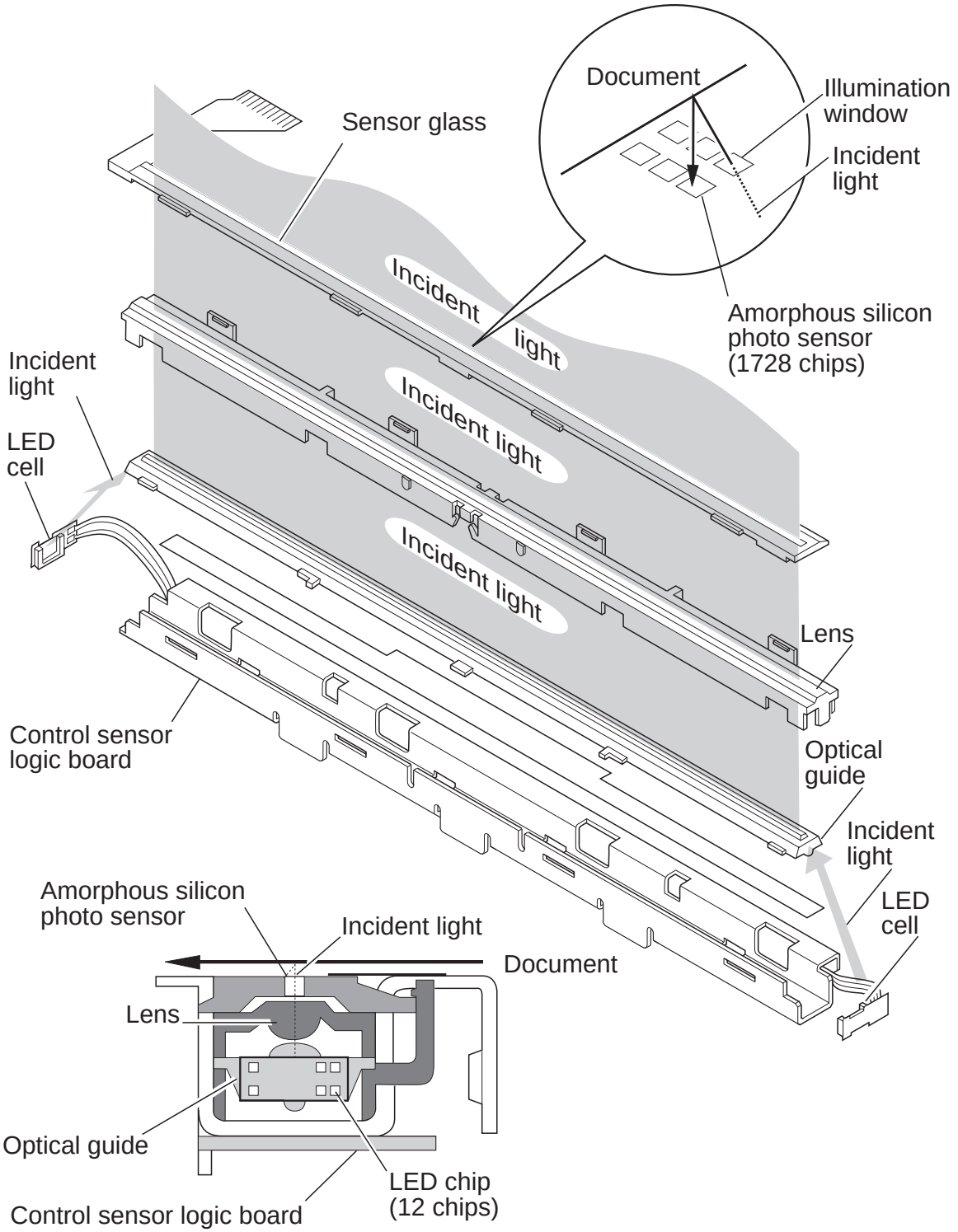



**Figure 2-5 Contact Sensor**

# 3. PAPER SUPPLY MECHANISM

The paper feed mechanism in this model is taken from the BJC-4200 BJ printer. This printer has no paper selection lever on automatic sheet feeder. If paper meets specifications, it can be fed without selecting operation the paper type. Also, this printer's paper feed mechanism can supply paper in two ways, automatically from the cut sheet feeder and manually from the manual feeding slot.

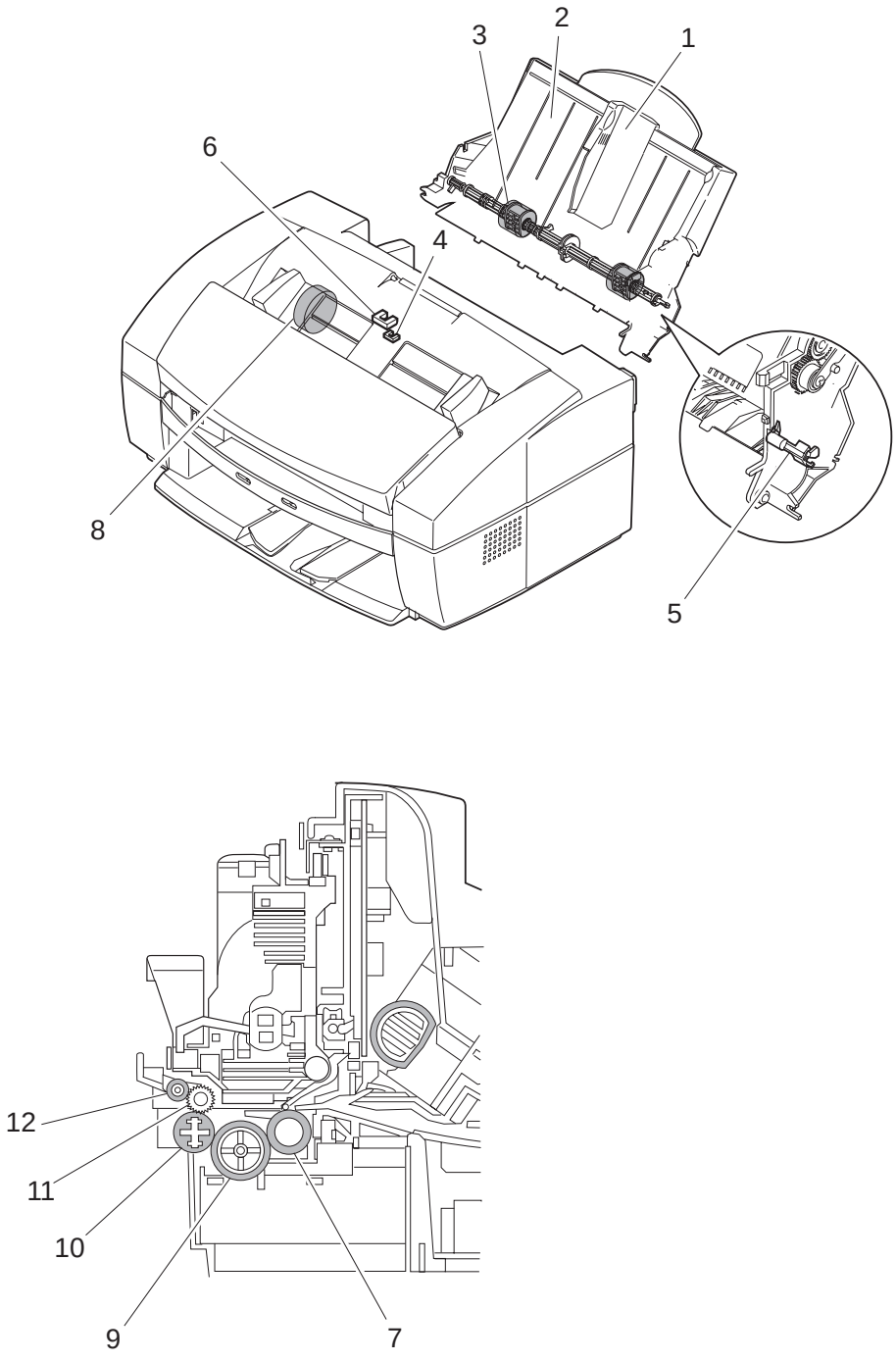



**Figure 2-6 Paper Feed Section**

**Names and functions of parts:**

**1. Paper guide**

The paper guide which slide manually is fixed align with the left side of the paper, to prevent skew.

**2. Lifting Plate**

This plate moves upwards by the force of the springs and the release cam mechanism, lifting the paper stack until it touches the Pickup Roller. After separation, it moves back down to its original position.

**3. Pickup roller** **→ See Page 2-10.**

The pickup roller has a semi circular roller. This roller is rotated once, and sends the paper once sheet at a time, as a result of corresponding operation with the lifting plate.

**4. Pickup Roller Sensor (PRS)**

This sensor monitors the initial position of the Pickup Roller position.

**5. Paper Separator** **→ See Page 2-11.**

The paper separator catches the corner of the recording paper or envelope, and holds the extra paper back.

**6. Paper Edge Sensor (PES)**

This sensor monitors the paper feed state, and detects jams and misfeeds.

**7. Paper Feed Roller** **→ See Page 2-10.**

The Paper Feed Roller transports paper, which has been picked up by the automatic sheet feeder, to the printing position in the Printer Section. It then feeds the paper one line at a time, in coordination with the carriage movement.

**8. Paper Feed Motor** **→ See Page 2-10.**

The Paper Feed Motor drive the paper supply mechanism and purge unit.

**9. Transmission Roller**

The transmission roller transmits the driving force of the paper feed roller to the paper eject roller.

**10. Paper Eject Roller**

A roller used to eject the paper.

**11. Spur**

This spur is used to transport the printed paper properly, without damaging its printed surface. It is shaped so as to make it difficult for ink to stick to it.

**12. Cleaner Roller**

A roller which cleans the spur when dirtied with ink.

NOTE

**Paper feed motor drive switching**

Power from the paper feed motor is switched for separation and feed of the paper, and nozzle cleaning mechanisms by the direction of paper feed motor rotation, the slide lock pin on the purge unit and swing gear. When the carriage moves in front of the purge unit, the carriage pushes the control pin, and releases the swing gear driven by the paper feed motor. When the paper feed motor rotates in the paper feed direction in this state, the swing gear rotates and moves up to the auto sheet feeder drive gear to drive the auto sheet feeder. Alternately, when the paper feed motor rotates in the reverse direction, the swing gear rotates and moves up to the purge drive gear to drive the purge unit.

When the control pin is locked, the paper feed roller is driven to feed the paper.

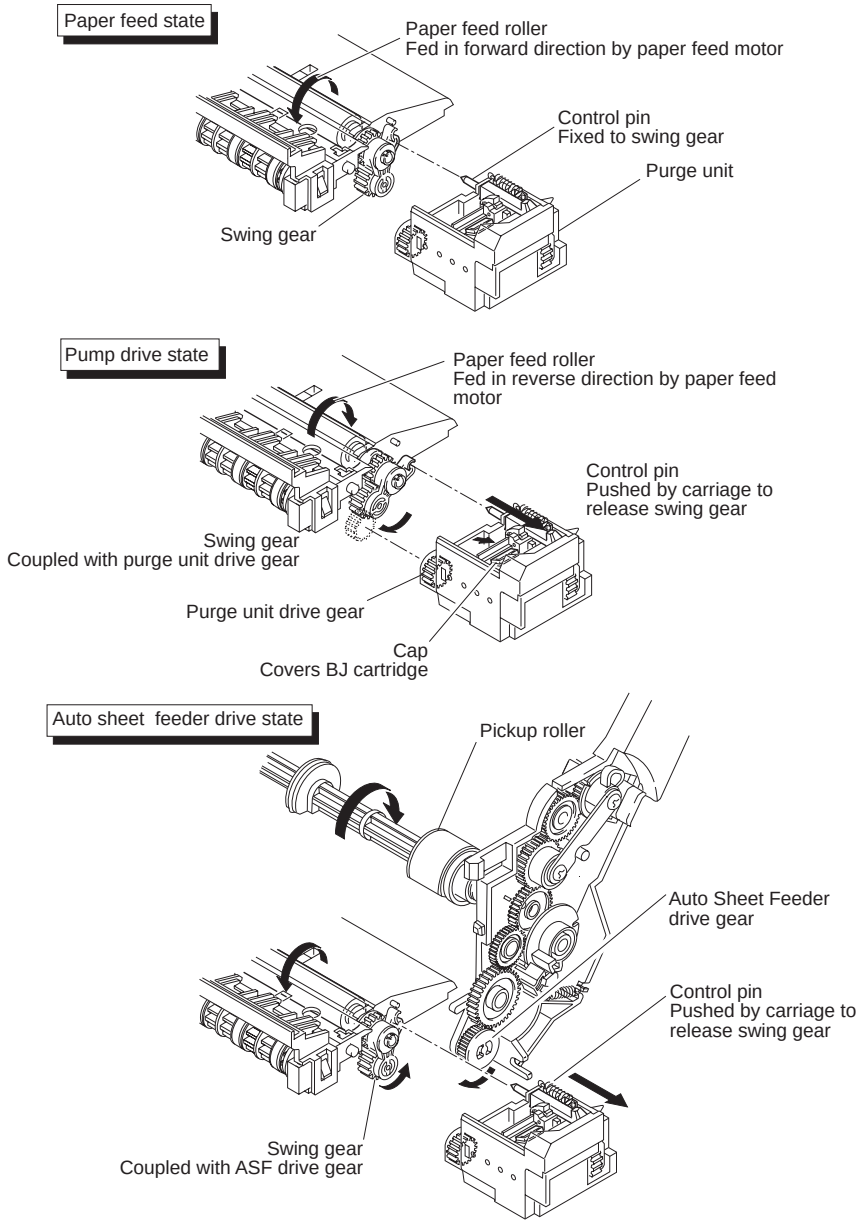



**Figure 2-7 Paper Feed Motor Drive Switching**

NOTE

**Paper Separation Mechanism (Automatic feed / Manual feed)**

This model has no paper selection lever on the automatic sheet feeder.
If the paper meets specifications, it can be fed without selecting operation the paper type.
The paper is loaded in the auto sheet feeder such that a corner of it is caught by the paper separator. When printing starts, the pick-up roller starts to rotate through the drive of the paper feed motor. Plain paper is fed with its corner held by the paper separator, and then pushed into the paper feed section. When printing on thick paper like envelopes, as the paper is stiffer than the return force of the paper separator's spring, the paper separator is pressed down to feed the paper.

Initial position of the pick-up roller is detected when the flag is sensed by the pick-up roller sensor on the PCNT board.
When the paper is sensed by the paper edge sensor for over a second, it is fed automatically until it reaches the starting position for printing.
If the paper is not sensed even when the paper pick-up operation is executed, it is executed again. If the paper is still not sensed, it is assessed as a paper feed error.
When manual feeding, set the paper in the manual feeding slot until it reaches the position where the paper edge sensor detects the paper.
Paper pushed into the paper feed section is fed to the starting position for printing after it has been sensed by the paper sensor for over a second.
At this time, the paper passes through a different paper path from that of the cut sheet feeder. This makes it possible to give priority to manually fed paper, even when paper is loaded in the cut sheet feeder.

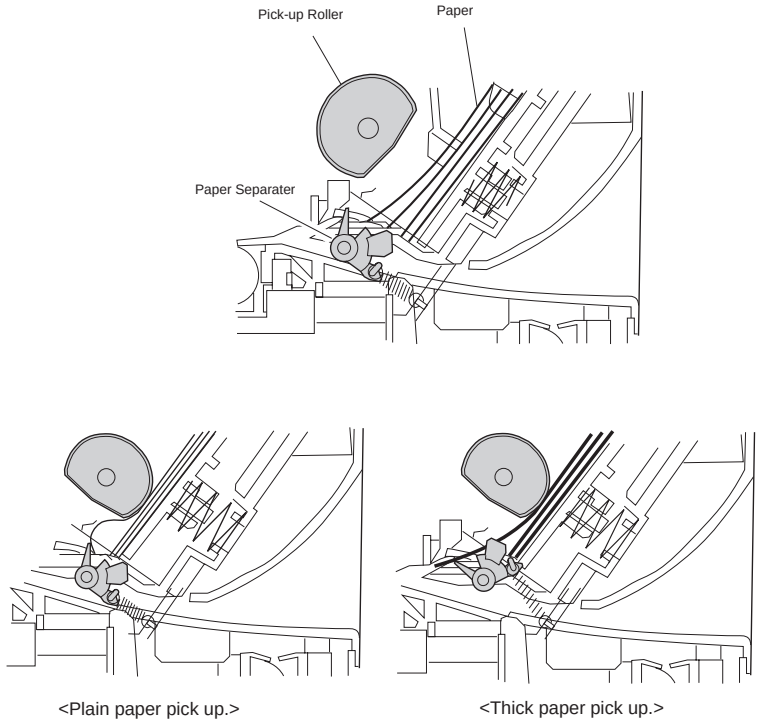



**Figure 2-8 Paper Separation Mechanism**

NOTE

**Paper feed error detection**

There are three types of paper feed error which may occur:

**a) No paper error**

Occurs when the Paper Edge Sensor does not detect the paper's leading edge the start of the paper picked up operation is executed, it is executed again. If the paper is still not sensed , it is assessed as a No paper error.

**b) Eject delay jam**

Occurs when the Paper Edge Sensor does not detect the paper's trailing edge after the page has been printed, or after 22 inches (558.8 mm) of paper eject operation has been performed.

**c) Paper size error**

When the size of the paper being fed is different from that registered in the user data, and the page being printed is divided during printing, a paper size error will occur.

When a paper feed error occurs, memory reception begins from the page at which the paper feed error occurred.

When copying, the data are erased from memory as soon as an error occurs.

# 4. PRINTER SECTION

The printer section mechanism in this model is taken from the BJC-4200 BJ printer. Major changes are as follows.

- Cartridge installation is not performed from the front, but from above.
- The spur attachment location has been changed.
- An ink detection sensor has been added.

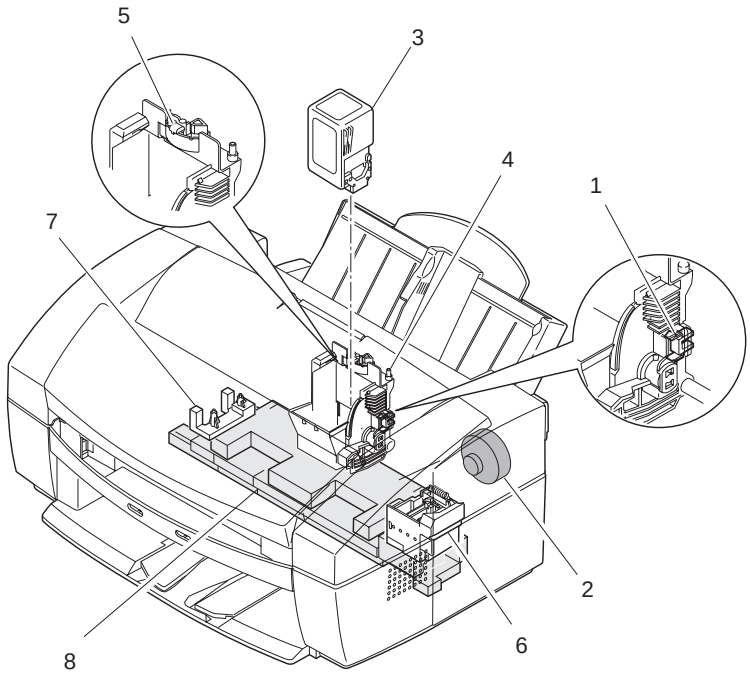



**Figure 2-9 Printer Section**

**Names and functions of parts**

**1. Home Position Sensor (HPS)** → **See Page 2-15.**

This sensor detects the home position edge and carriage position. Also, at the capping position, the on/off of purge sensor flag during the pump operation is detected.

**2. Carriage Motor**

This is a stepping/pulse type motor, which is controlled with pulse width modulation. It moves the carriage by belt drive.

**3. BJ Cartridge** → **See Page 2-20.**

**4. Carriage**

Driven by the carriage motor, the carriage moves horizontally across the paper. Through the carriage ribbon cable, the printing signals from the logic board are transmitted to the BJ cartridge in the carriage.

By controlling the purge unit's slide lock pin, the carriage controls the engagement of the paper feed motor's drive power between the paper feed/purge unit and the sheet feeder.

**5. Paper thickness adjustment lever**

Adjust the gap between the print head and paper according to the thickness of the paper.

**6. Purge unit** → **See Page 2-15.**

In order to maintain the BJ cartridge's high print quality, the BJ cartridge's nozzles and spray orifices are cleaned by a wiper and pump. When in standby mode, the BJ cartridge's spray orifice section is covered by a rubber cap to prevent the nozzles from drying out and ink from leaking.

The purge unit controls the swing gear. This gear switches power from the paper feed motor for separation of the paper, paper feed and nozzle cleaning.

**7. Ink Detection Sensor** → **See Page 2-18.**

Ink is ejected directly over the optical axis of a pass-type photosensor, which detects the change in light intensity to determine whether or not ink is being ejected.

**8. Waste ink absorbers**

Absorb waste ink from cleaning or ink empty detection.

NOTE

For details on BJ cartridge holding, carriage drive and pump operation state detection, see the *FACSIMILE BASIC•INTER SUPPLEMENT 2 (supplied separately).*

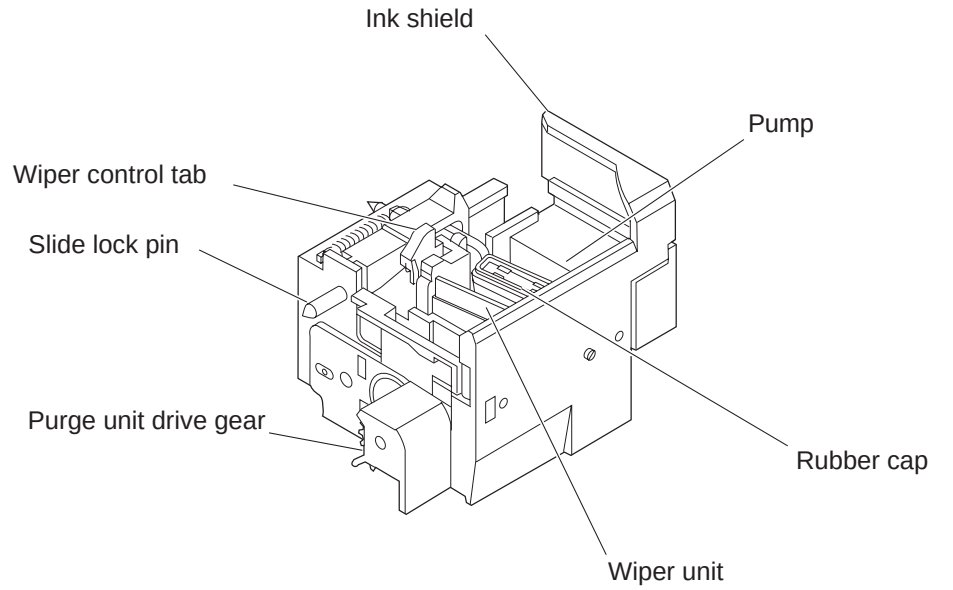



**Figure 2-10 Purge Unit**

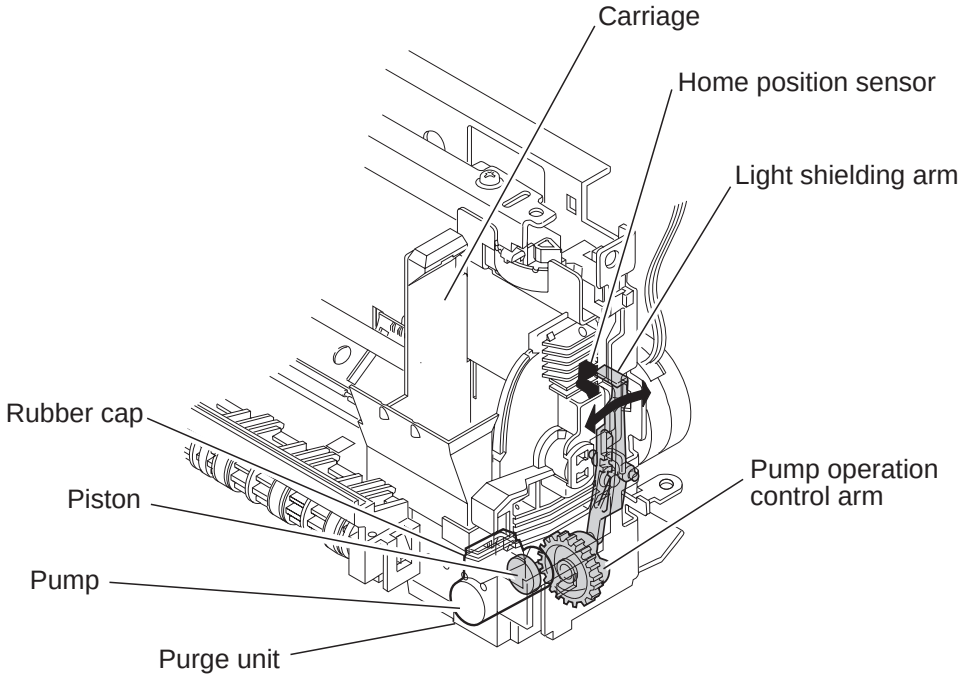



**Figure 2-11 Pump Operation State Detection**

NOTE

**BJ head protection**

In order to always maintain good print quality, this model performs cleaning of the BJ head at appropriate times.
There are three types of cleaning operations: pump suction, wiping, and maintenance jet. Also, the print head is capped after printing, to preserve the head.

- **Cleaning operation (pump suction)**

Cleaning operation is performed using the cap and pump of the purge unit.

The cleaning operation is performed at the following times:
- When the user initiates a cleaning operation
- At power-on
- When the BJ cartridge is changed
- At the start of a print operation when at least 72 hours has passed since the last cleaning
  (However, when using the BC-21/BC-22, the first cleaning after changing the BJ cartridge/ink cartridge will occur when a print operation begins after 24 hours or more.)

- **Wiping operation**

When the carriage passes by from left to right, the wiper blade drops down so that it does not touch the print head. When the carriage passes by from right to left, the blade rises to contact the print head and wipe away paper fibers and ink residue.

The wiping operation is performed at the following times:
- At the start of printing when less than 72 hours has passed since the last cleaning operation
- Every 60 seconds during printing (or after a fixed number of dots have been ejected)
- During a capping operation

- **Maintenance jet**

The maintenance jet operation prepares the nozzle spray orifice ink surface shape by performing an ink test, firing at the maintenance jet absorber.
The maintenance jet operation is performed during a cleaning operation, after a wiping operation, and after a fixed time (BC-20: 12 seconds; BC-21/BC-22: variable, between 5 and 20 seconds) while printing.

- **Capping after print completion**

The capping operation is performed at the following times:
- When a fixed amount of time passes after the completion of printing without new print data being received by the Printer Section
- During printing, after the second wiping operation (i.e. after 120 seconds) with no print data received by the Printer Section
- After changing the BJ cartridge

NOTE

**Print Shift Correction**

Print gaps can occur when doing bidirectional printing, due to changes in the weight of the BJ cartridge and mechanical errors. This gap is corrected by adjusting the carriage drive motor load and the carriage position, which is determined logically from the number of stepping pulses. Gap detection is performed before the start of printing, during the home position detection operation.

NOTE

**Ink empty detection**

Ink empty detection during fax operation is performed by firing black ink between the light source and receptor of the ink sensor, located on the left side of the printer. This function does not work with the BC-22, only with BC-21 or BC-20.

When ink passes between the source and the receptor, as shown in *Figure 2-12*, the sensor output will be a pulse waveform. The presence of ink may be determined from the pulse generation time.

Ink empty detection is performed at the end of each received page of printing. If it is determined that there is ink remaining, the image data for that page will be erased from memory. If the cartridge is out of ink, the message **"REPLACE CARTRIDGE"** will be displayed to inform the user that the cartridge is out of ink, and the page will be "received" to memory again from the image data.

The detection level of the ink detection sensor is adjusted automatically by means of a feedback circuit, and thus requires no manual adjustment. If the sensor output does not reach a standard level, even after performing feedback control (such as if the receptor is completely blocked, or if a sensor defect occurs), the ink sensor failure will be reported with the display of the **"CHECK PRINTER"** (error code ##348) message.

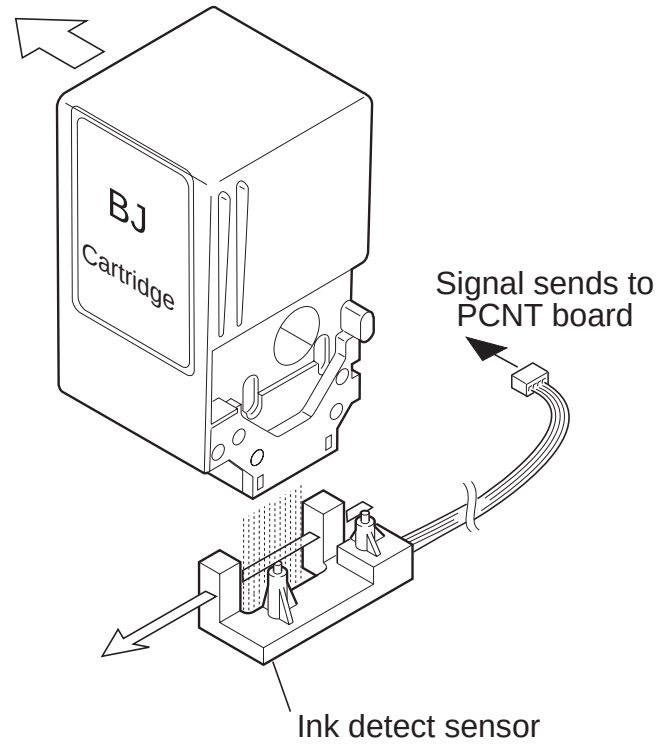



**Figure 2-12 Ink Empty Detection**

NOTE

**Waste Ink Absorbers**

This model has a single ink absorber which absorbs waste ink as follows.

- Suction waste ink
  Waste ink sucked from the cap
- Maintenance jet waste ink
  Waste ink from the test firing used to adjust the nozzle condition
- Ink detection waste ink
  Waste ink fired to detect the presence of remaining ink during fax receipt

The amount of ink absorbed is counted as a total of all of these. When the counted absorption levels reach 100%, the **"CHECK PRINTER"** message (error code ##342) will be displayed, and printing will stop to allow the absorber to be changed. To clear the error, it is necessary to replace the absorbers and to reset the waste ink absorption level counts. If there is no other error at this time, any image in the memory will be output automatically. The waste ink absorber should be replaced after this. For the method of resetting the waste ink absorption level counts, see *Page 1-49.*

# 5. BJ CARTRIDGE

This model accepts three types of BJ cartridges, the BC-20, BC-21 and BC-22.

## 5.1 Structure

### a) BC-20 Black BJ cartridge structure

The black BJ cartridge contains a 360 dpi × 128 nozzle bubble jet print head unit, on-demand thermal ink jet type, containing 44 ml of ink. The black ink contained in the ink sponge is filtered with a meshed ink filter to remove dust, and sucked into bubble jet print head unit through a joint pipe.

### b) BC-21 Color BJ cartridge structure

The color BJ cartridge has a printing head equipped with 360 dpi × 136 nozzles through which the four ink colors are ejected (24 nozzles each for yellow, magenta, and cyan; 64 nozzles for black). The ink cartridge (one for black and one for the other three colors) are removable and replaceable. The BCI-20 black ink tank contains 9 ml of black ink. The BCI-21 color ink tank contains 5 ml each of yellow, cyan, and magenta ink.

### c) BC-22 Photo Color BJ cartridge structure

The photo color BJ cartridge has a printing head equipped with 360 dpi × 136 nozzles through which the four ink colors are ejected (24 nozzles each for yellow, magenta, and cyan; 64 nozzles for black). The BJ cartridge contains 9 ml of black ink , 5 ml each of yellow, cyan and magenta ink.

REFERENCE

For details on the structure of the Bubble jet head unit structure (Printing mechanism), INKSAVER (economy) printing, and maintenance jet, see the *FACSIMILE BASIC•INTER SUPPLEMENT 2 (supplied separately)*.

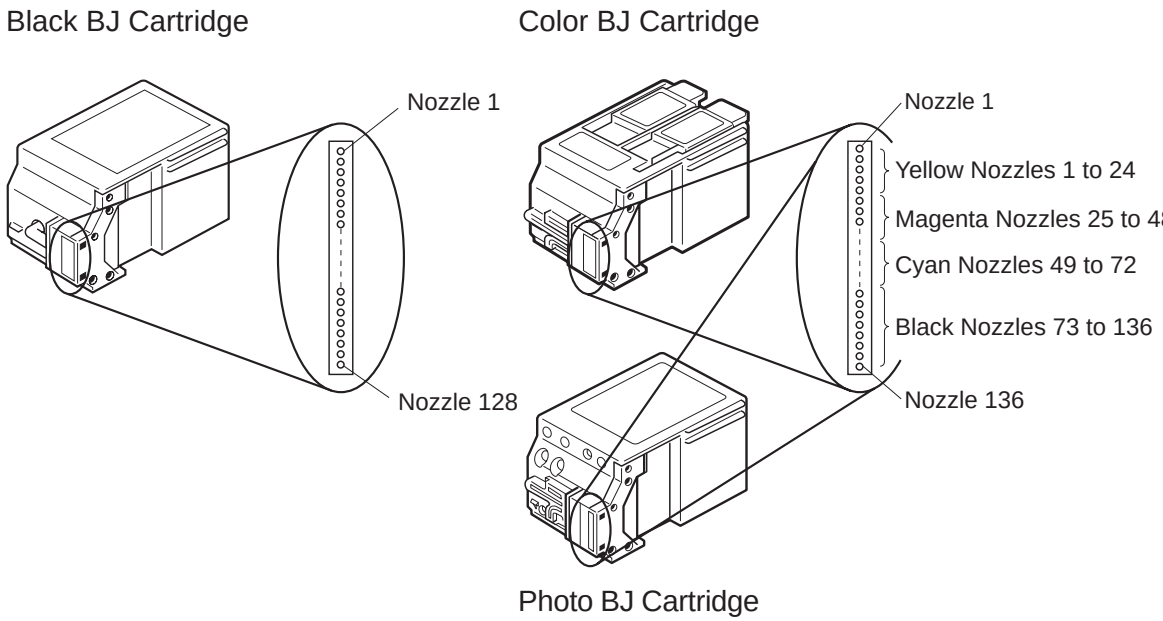



**Figure 2-13 Nozzle Arrangement**

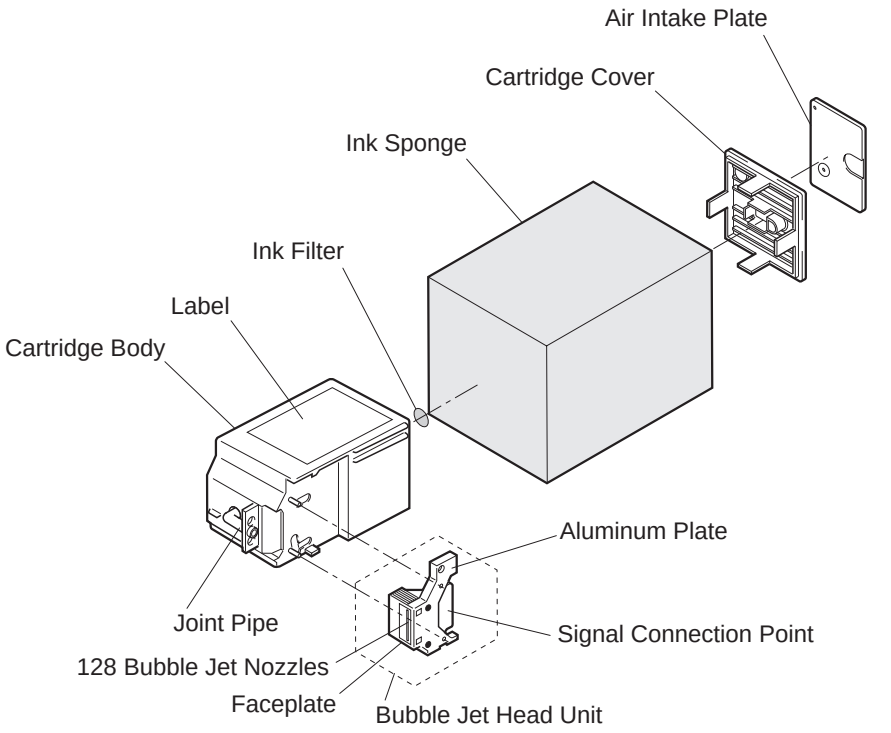



**Figure 2-14 Black BJ Cartridge Structure**

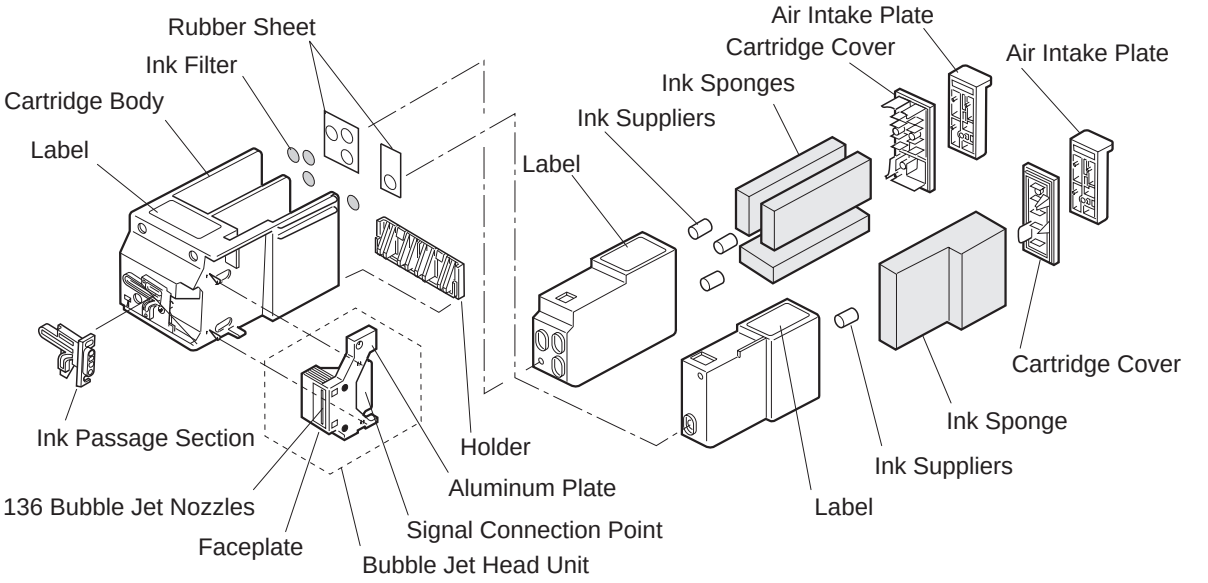



**Figure 2-15 Color BJ Cartridge Structure**

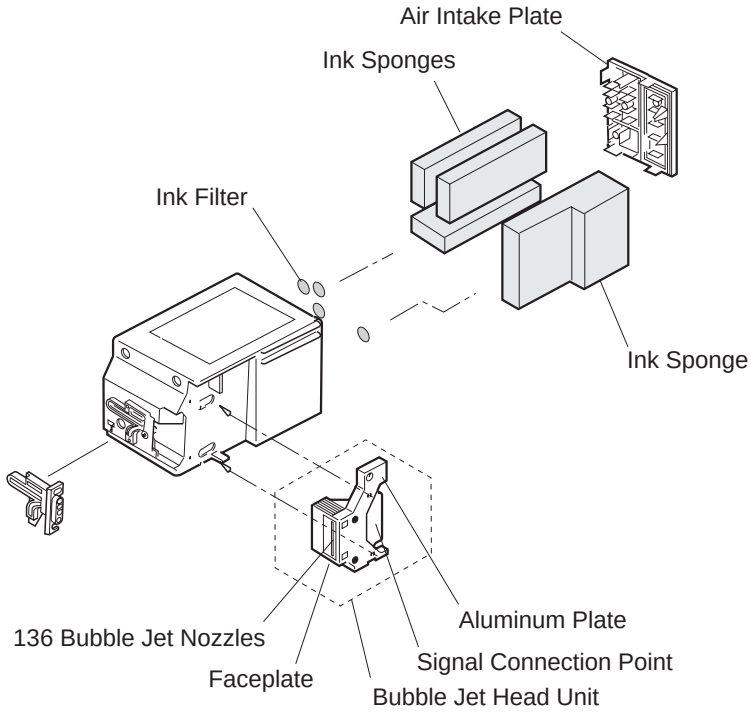



**Figure 2-16 Photo BJ Cartridge Structure**

## 5.2 BJ Head Driver Block Diagram

**• 128/136 bit shift resistor**

Stores the printing data (HDATA) transferred from the control board at HCLOCK's timing.

**• 128/136 bit latch**

Latches the printing data (HDATA) converted by the 128/136 bit shift resistor.

**• Block enable decoder**

After the BENB (Block enable) 0, 1, and 2 code signals are input, the specified heat timing signal is output. The heat timing signal is divided into eighth.

**• Heater (1 to 128 and 1 to 136)**

The heater generates the bubbles required for the nozzles to eject the ink. The heater heats the bubble jet nozzles. Heating is executed with the timing signal produced by the block enable decoder and the even nozzle heat enable (EvenENB), odd nozzle heat enable (OddENB), and heat enable (HENB0 to 3) signals.

**• Sub heater**

This heater maintains the optimum conditions in the nozzle for ejecting ink.

**• Temperature control heater**

This heater controls the head temperature to stabilize the ink ejecting amount.

**• Rank resistor**

To execute optimum heat control of each BJ cartridge, production-related deviation in heater characteristics is classified into 13 types which are identified by changing the rank resistance. From the printer MPU's analog port, the printer MPU detects the different rank resistance as voltage values and converts them from analog to digital for detection. The heater's characteristics are thereby recognized.

**• Head temperature sensor**

Temperature changes in the nozzle's heater are detected by the diode to prevent the bubble jet head from overheating.

**• Cartridge ID**

With the ID0 and ID1 combinations, the BJ cartridge type (color or black or photo) is recognized.

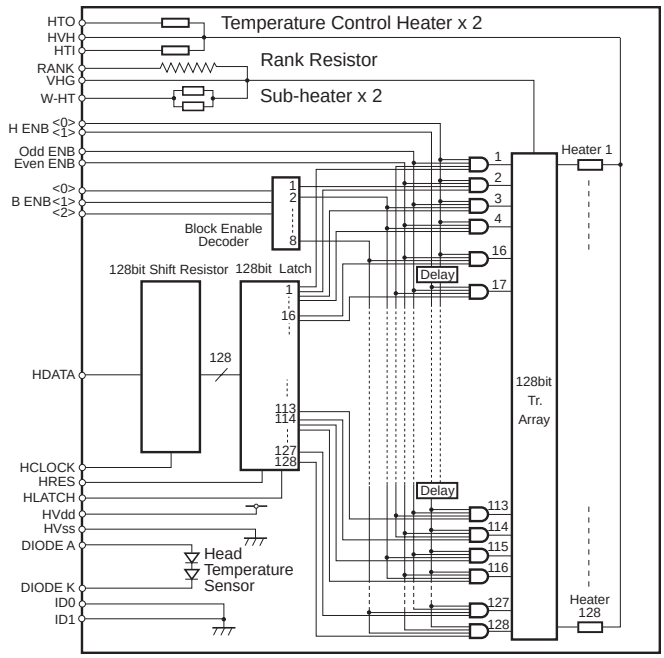
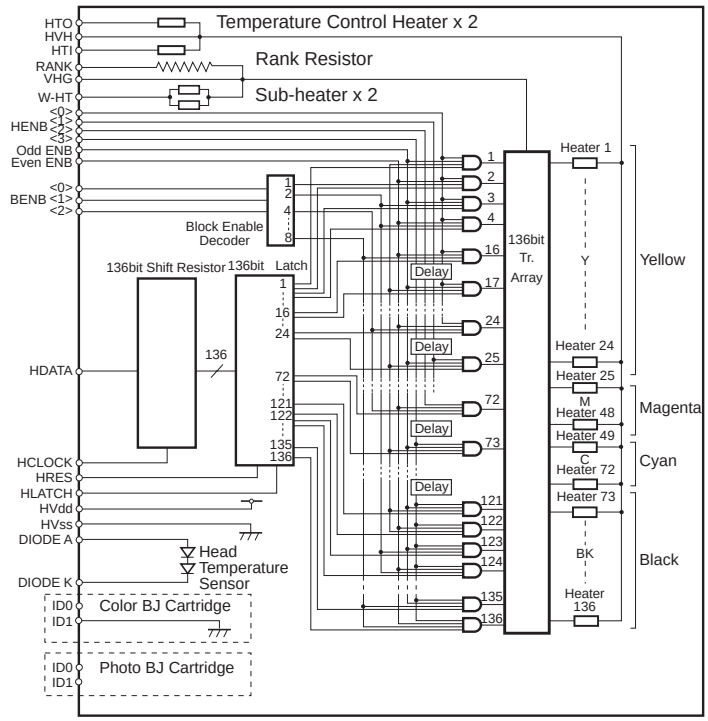



**Figure 2-17 BJ Head Driver Block Diagram (Black BJ Cartridge)**




Color BJ cartridge and Photo BJ cartridge have the same circuit configuration except for the ID1 connection.

**Figure 2-18 BJ Head Driver Block Diagram (Color BJ Cartridge)**

## 5.3 Printing Signal

### a) Black BJ cartridge drive control

The black BJ cartridge driving control is executed by dividing the head's 128 nozzles into 8 blocks (16 nozzles each). These blocks are further divided into odd and even blocks (8 nozzles each). The odd blocks eject ink simultaneously, and the even blocks do so as well. The control signals for the former are the block enable 1, 2, and 3 signals (BENB 1, 2, 3), and for the latter the signals are the even/odd enable signals (Even/odd ENB).

The heat enable 0 and 1 (HENB 0, 1), which are the heater drive control signals for ejecting the ink, comprise the pre-pulse and main pulse. To constantly achieve optimum ink ejecting, the internal conditions such as the head's rank, printer temperature, head temperature are monitored, and the heater drive pulse width is varied before the pulse is output. Also, the printing drive signal from the printer controller is transferred to the BJ head's shift resistor according to the HLATCH timing.

The printing drive signal (HDATA) is latched and when the printing control signal and heater drive control signal are output together, the heater for the applicable nozzles is driven, and the ink is ejected.

### b) Color BJ cartridge drive control

The color BJ cartridge head's nozzle configuration differs from that of the black BJ cartridge. (The black has 64 nozzles while the color has 24 nozzles each for Y, M, and C.) Therefore, the number of nozzles in each control block is different from that of the black BJ cartridge. Also, since the heaters are driven simultaneously for each color, the heater drive control signals used are the heat enable (HENB) 0, 1, 2, and 3 signals. Otherwise, everything else is the same as with the black BJ cartridge.

For heat enable, the HENB 0, 1, and 2 signals drive the nozzle heaters for Y, M, and C. The HENB 3 signal drives the nozzle heater for black ink.

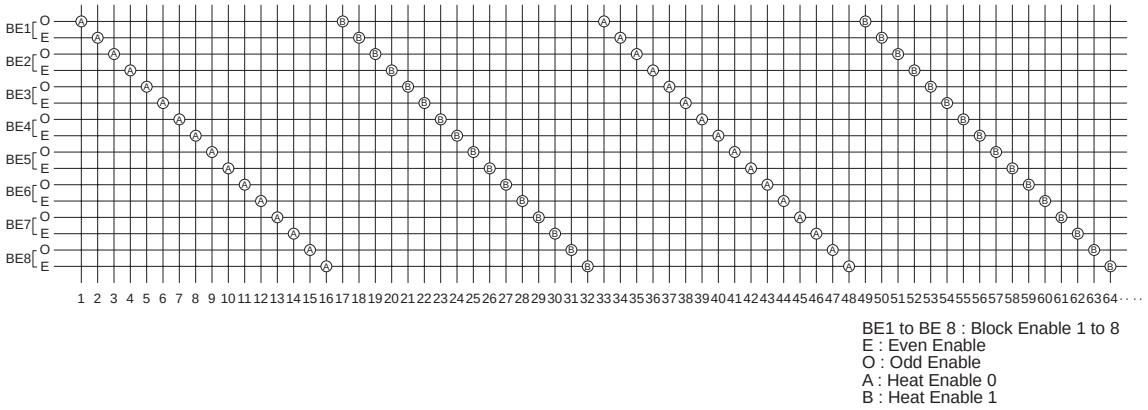



**Figure 2-19 Printing Sequence (Black BJ Cartridge/HQ Mode)**

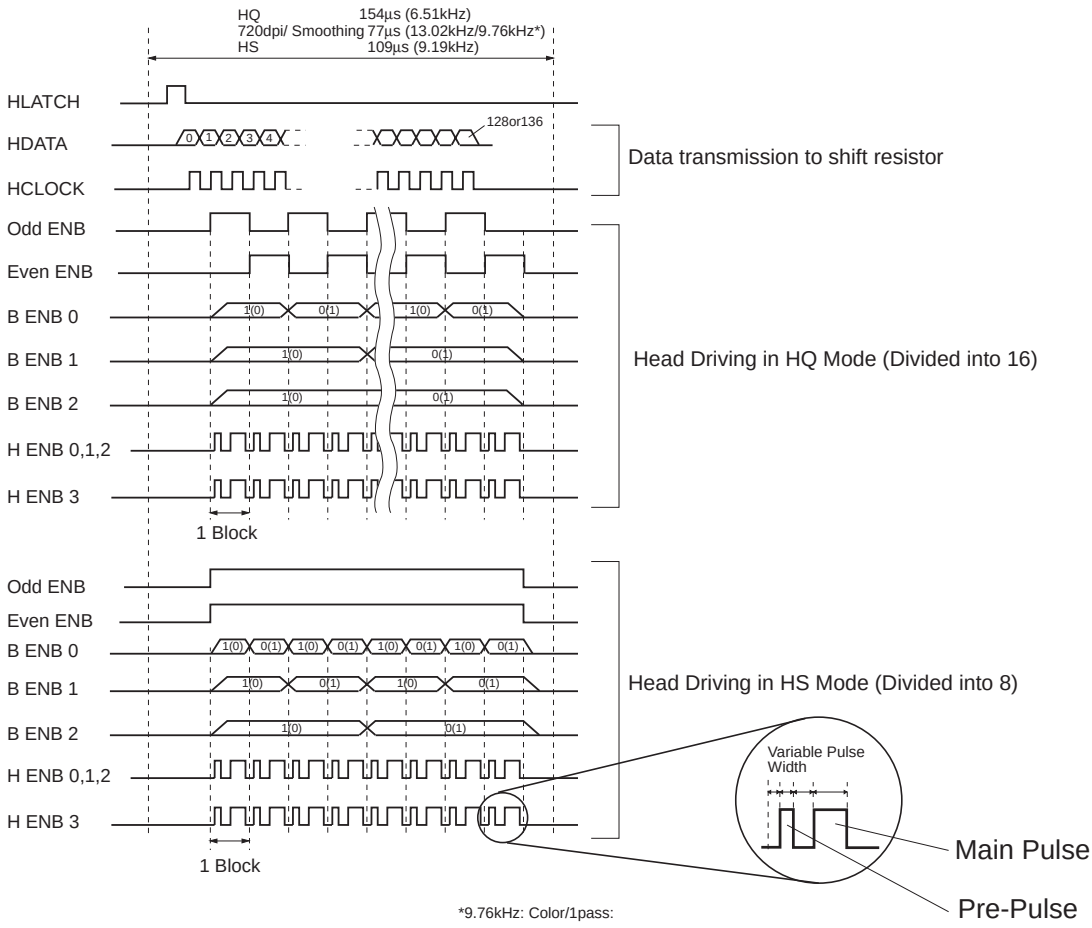



**Figure 2-20 Printing Signals (HQ Mode)**

# 6. ELECTRIC CIRCUIT

## 6.1 Component Block Diagram

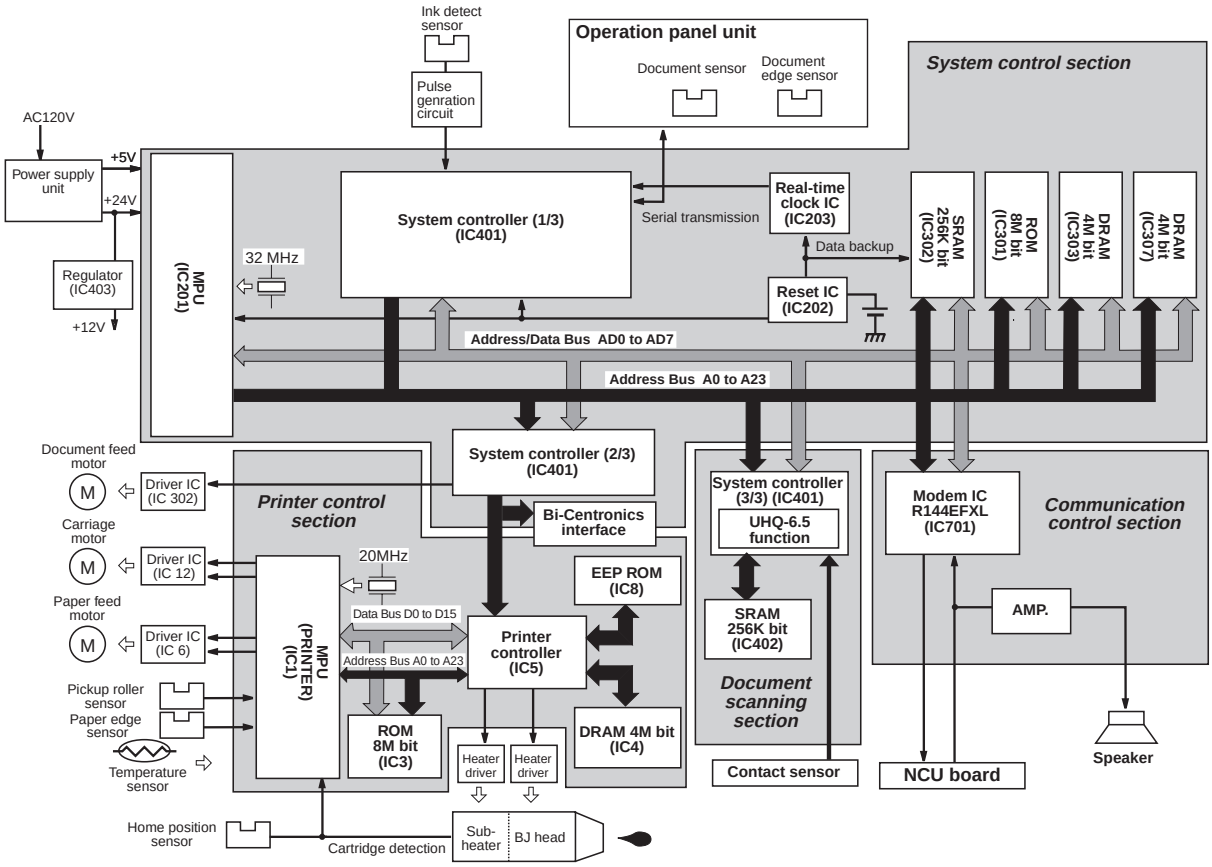



**Figure 2-21 Block Diagram**

## 6.2 Circuit Board Components

### a) System control section

The system controller is made up of the following components, and controls the entire fax system.

#### a-1) MPU (Micro Processor Unit) (IC 201)

The main functions of the NEC µPD70433GJ-16-3EB MPU are as follows.

- 16 bit CPU
- 24 bit address bus
- 8 bit data bus
- DMA control
- A/D converter
- Serial interface
- Software CODEC
- Interrupt control unit

#### a-2) System controller (IC 401)

The system controller is a gate array for controlling MPU peripheral devices. The main functions of the system controller are as follows:

- Printer resolution conversion (Ultra-smoothing)
  This IC converts facsimile data of horizontal resolution of 8 dots/mm and vertical resolution of 3.85 or 7.7 lines/mm to print data of 360 dpi and 360 dpi, respectively.
- BJ printer interface
  8 bit parallel print data sent to the Printer controller.
- OPCNT serial interface (Contains document sensor and document edge sensor signals)
- DRAM/SRAM controller
  Controls DRAM/SRAM read/write and renewal.
- Document feed motor control
- Serial-to-parallel conversion
- Horizontal scaling
- Detection of document edge sensor and ink detection sensor

#### a-3) RTC (Real Time Clock) IC (IC 203)

RTC4543 is used as the RTC. The RTC IC is backed up by lithium battery, and counts the date and time.

#### a-4) Main ROM (IC301)

This 8 Mbit ROM contains the control programs (e.g. operation panel, scanner and communications section etc.) for this fax.

#### a-5) SRAM (IC 302)

This 256 Kbit SRAM is backed up by lithium battery. SRAM holds data registered for system control and communications management information. Also, SRAM stores shading correction data.

#### a-6) DRAM (IC 303, IC 307)

Two 4 Mbit DRAMs are used as memory for storing image data, and as an MPU work area.

### b) Communication control section

#### b-1) Modem IC (IC 701)

A Rockwell R144EFXL PQFP is used as the modem IC. The MODEM IC carries out G3 modulation conforming to ITU-T standards V.27ter, V.29, V.17 and V.33 on transmitted data received from the MPU during transmission. During reception, the MODEM IC carries out G3 modulation on received signals from the telephone line, according to the same standards.

### c) Document scanning section

#### c-1) System controller IC (IC 401)

The system controller IC include image processing function (UHQ-6.5) are as follows:

- A/D conversion
  Input signals from the contact sensor are A/D converted.
- Generation of shading data
- ABC (Auto Background Control)
  Sets the slice level for each scan line.
- Edge enhancement processing
- Binaryzation processing
- Halftone processing

#### c-2) SRAM (IC 402)

This 256 Kbit SRAM is used as a buffer for the image processing data and shading correction data.

**d) Printer control section (On the PCNT board)**

**d-1) Printer controller (IC 5)**

The main functions of the printer controller are as follows:

- Bi-centronics interface
- EEP-ROM control
- DRAM control
- Buffer control
- Print head control

**d-2) MPU (IC 1)**

- 16 bit CPU
- 24 bit address bus
- 16 bit data bus
- Carriage motor / Line feed motor control

  The stepping motor controller outputs the carriage motor's single- and two-phase exciter drive signal, and paper feed motor's two-phase drive signal.

  The stepping motor controller switches the carriage motor with the 5-step peak current value for optimum driving. The stepping motor controller outputs the switching control signal to the carriage motor driver.
- Detection of BJ head temperature
- Detection of printer's internal temperature.
- Detection of Home position sensor, Paper edge sensor and Pickup roller sensor.
- Cartridge detection.
- Ink detection sensor control

**d-3) ROM (IC 3)**

The 8 Mbit control/CG ROM contains the program and bitmap font data for printer control.

**d-4) DRAM (IC 4)**

4 Mbit DRAM is used as the receive buffer, download buffer, print buffer, and working area.

**d-5) EEPROM (IC 8)**

Controlled by the printer controller, the 1 Kbit EEPROM (Electrically Erasable and Programmable ROM) stores various printer emulation settings, and the waste ink amount discharged to the waste ink absorber.

## 6.3 Flow of Image Signals

### a) G3 transmission

(1) With the LED as a light source, the image is scanned by the contact sensor, and analogue image data sent to the SCNT board.
(2) The System controller IC (Internal UHQ unit) converts analogue image data from the contact sensor to digital image data.
(3) The system controller IC converts processed image data from serial data to parallel data, and writes them to the DRAM.
(4) The MPU encodes raw data in the DRAM using a soft codec, and rewrites the encoded data into the DRAM.
(5) The MODEM IC modulates the coded image data.
(6) The modulated data are then sent from the MODEM IC to the NCU board.
(7) The data are returned to the SCNT board and, from there, are sent to the line for transmission.

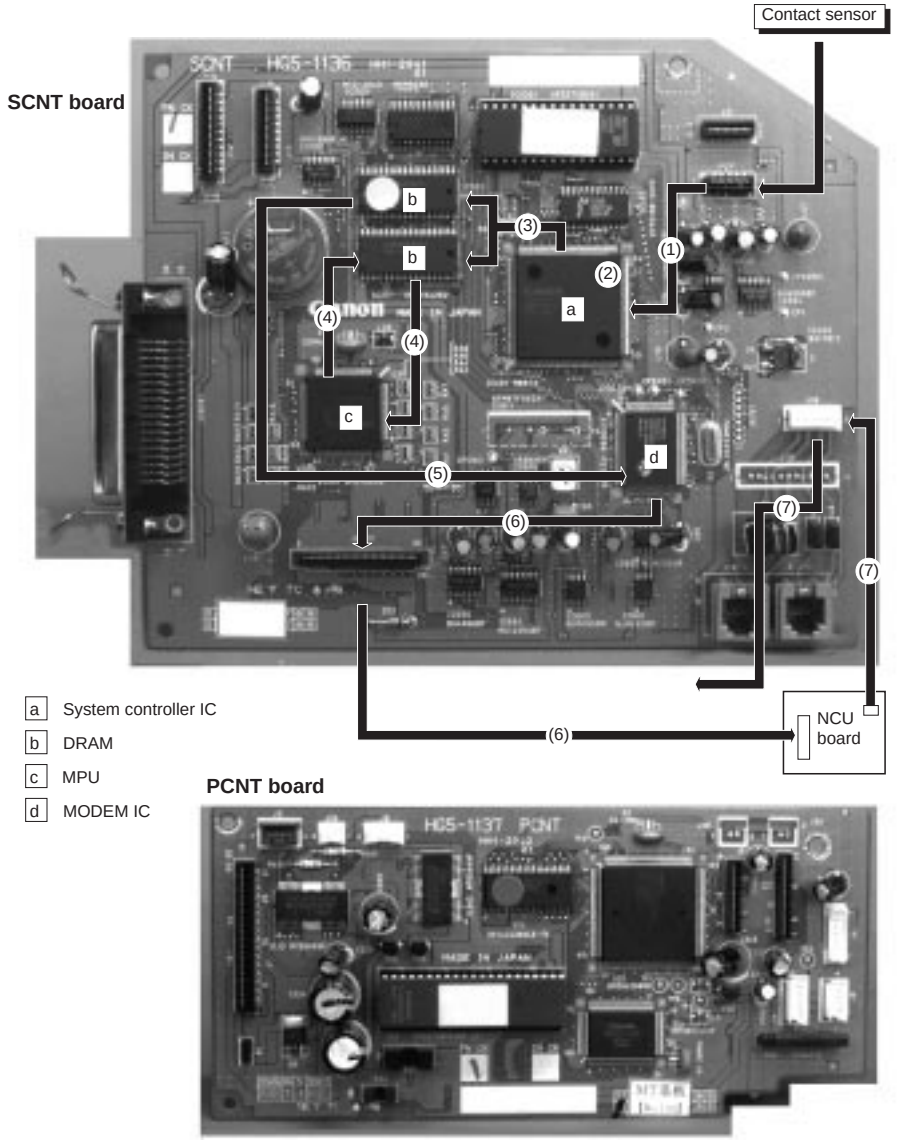



**Figure 2-22 G3 Transmission Image Signal Flow**

**b) G3 Reception**

(1) Image signals received by L1, L2, pass through the hybrid circuit in the NCU, and are amplified. The modem demodulate these images, and writes them to the DRAM.

(2) The MPU decodes the demodulate image data, checks errors, stores them in the DRAM, encodes the data and rewrites them into the DRAM.

(3) The system controller IC converts the decoded data from run-length data to raw data, and converts 8 dot/mm fax data into 360 dpi resolution converted printer data, and writes them to the DRAM.

(4) The system controller IC converts the resolution converted printer data to BJ printer head control signals, and then sends the signals to the BJ print head, via the BJ controller IC. Simultaneously, the printer MPU sends motor control signals to the carriage motor and line feed motor, via the driver IC.

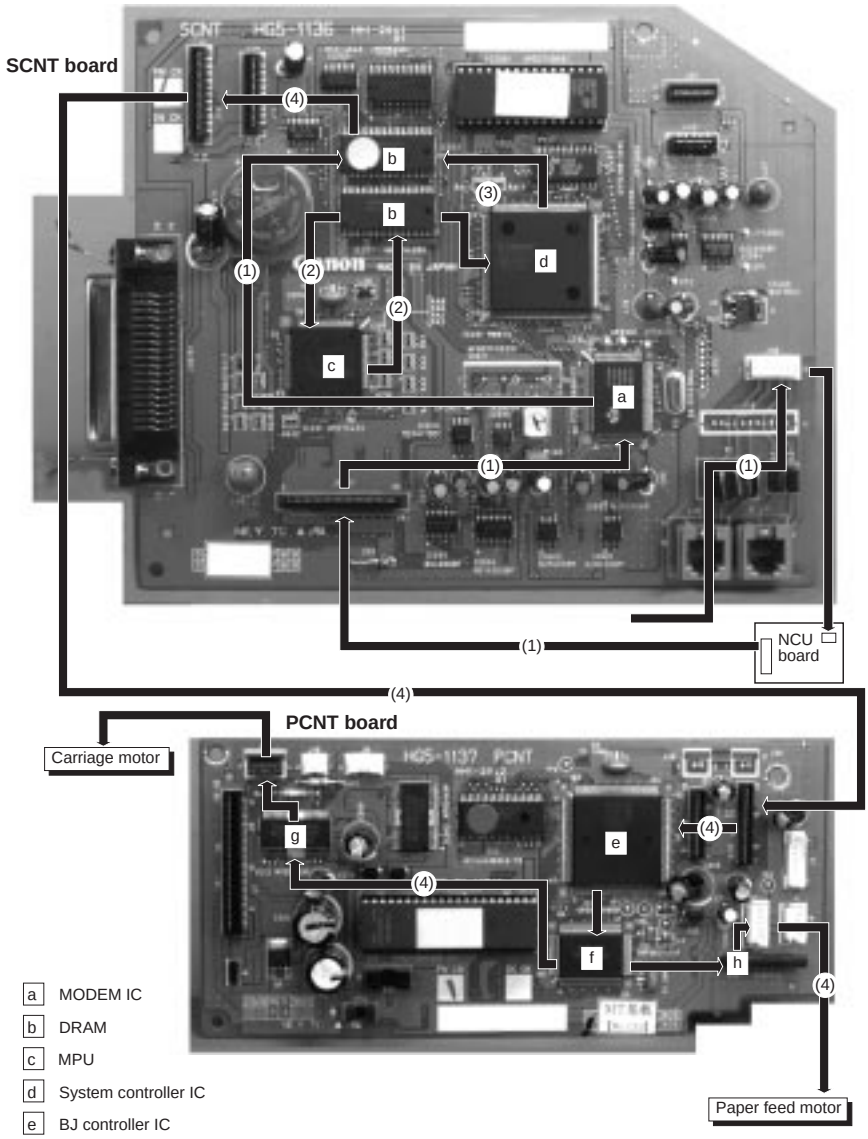



**Figure 2-23 G3 Reception Image Signal Flow**

# 7. COMMUNICATION SYSTEM OPERATIONS

## 7.1 FAX/TEL Switching

This fax is set to automatically switch between fax and telephone, on the same telephone line. If the other party is a fax, the fax is received automatically, and if the other party is a telephone, the alarm in the main unit is rung to alert the user.

### 7.1.1 Settings

(1) Press the *RECEIVE MODE* button to select Fax/Tel mode.

(2) Set the **"F/T SW ACTION"** in **RECEIVE (RX) SETUP** menu (see the *MultiPASS Desktop Manager for Windows User's Guide for instruction*)

### 7.1.2 Parameters

| Item | Default setting | Setting switch | Selection range |
|---|---|---|---|
| RING START TIME (Pseudo Ring start time) | 8 sec. | User data | 0 to 30 sec. |
| F/T RING TIME (Pseudo Ring time) | 15 sec. | User data | 10 to 45 sec. |
| F/T SW ACTION (Operation after FAX/TEL switching) | RECEIVE | User data | RECEIVE/ DISCONNECT |
| Pseudo RBT frequency | 400 Hz | None | None (fixed) |
| Pseudo RBT transmission from CML on time until start (CNG detection time) | 4 sec. | Service data #3 16 | 0 to 9 sec. |
| Pseudo RBT pattern on time | 1000 ms | Service data #3 17 | 0 to 9990 ms |
| Pseudo RBT pattern off time (short) | 0 ms | Service data #3 18 | 0 to 9990 ms |
| Pseudo RBT pattern off time (long) | 2000 ms | Service data #3 19 | 0 to 9990 ms |
| Pseudo RBT transmission level | -23 dBm | Service data #3 24 | -23 to -8 dBm |
| Pseudo ring frequency | 25Hz | Service data #2 10 | 17Hz/25Hz/50Hz |
| Pseudo ring pattern on time | 1000 ms | Service data #3 20 | 0 to 9990 ms |
| Pseudo ring pattern off time (short) | 0 ms | Service data #3 21 | 0 to 9990 ms |
| Pseudo ring pattern off time (long) | 2000 ms | Service data #3 22 | 0 to 9990 ms |
| CNG detection level | -47 dBm | Service data #3 23 | -50 to -29 dBm |

## 7.2 Answering Machine Connection

This connection is for effective use of an answering machine connected to the extension phone jack. If the other party is a telephone, the answering telephone records the message, and if the other party is a fax, the fax receives automatically.

### 7.2.1 Settings

(1) Connect the answering machine to the extension telephone jack, and set the answering machine to **"Answer"**.

(2) Press the fax's *RECEIVE MODE* button and select the Ans. Machine mode.

(3) When putting the fax into reception mode by detecting no-sound on the line, set the **"SILENT DETECT"** to **"ON"**, then set the no-sound time with user data **"DURATION"**. (See the *MultiPASS Desktop Manager for Windows User's Guide for instruction*)

### 7.2.2 Parameters

| Item | Default Setting | Setting Switch | Selection Range |
|---|---|---|---|
| SILENT DETECT | OFF | User data | ON/OFF |
| DURATION | 4 sec. | User data | 1 to 99 sec. |
| No-sound detection level | -50 dBm | Service data #3 26 | -54 to -30 dBm |
| Signal detection time | 60 sec. | Service data #3 25 | 0 to 999 sec. |

# 8. NEW FUNCTION

There is no new function in this model.

# 1.MAINTENANCE LIST

## 1.1 Consumables

| Level | Consumable | When |
|---|---|---|
| User | BJ cartridge (BC-20 / BC-21 / BC-22) | When **"REPLACE CARTRIDGE"** is displayed or when ink has run out. |
| | INK cartridge (BCI-21 Color / BCI-21 Black) | When using BC-21, one of the other of "YMC color" or "Black" has run out. |
| Service Technician | None | |

## 1.2 Cleaning

For the cleaning procedure, see *2. HOW TO CLEAN PARTS on page 3-4*.

| Level | Location | When |
|---|---|---|
| User | Main unit outer covers | When dirty. |
| | Printer platen | When ink adheres to the platen. |
| Service Technician | Separation roller | When document separation performance deteriorates. |
| | Separation guide | When document separation performance deteriorates. |
| | Glass window (contact sensor) | When black vertical stripes appear in copied or transmitted images. |

NOTE

**Cleaning the document feed roller**

The document feed roller does not need to be cleaned, as the feeding operation is not affected by dirt, and there is no pre-scan operation.

## 1.3 Periodic Inspection

None

## 1.4 Periodic Replacement Parts

None

## 1.5 Adjustment Items

The following adjustments must be made on this fax.
For the adjustment procedure, see *3. ADJUSTMENT on page 3-6.*

| Item | When |
|---|---|
| Shading data | When the SCNT board, or the lithium battery, or the contact sensor are replaced. Also, when image defects such as black spots appear in PHOTO mode. |
| Vertical Alignment | When the vertical lines shift during Bi-directional printing. |
| Head gap | When the carriage guide frame and the platen installation positions have been moved, resulting in the head gap changing. |

NOTE

**"DATA ERROR"** is displayed. If you press the *START/COPY* button, the shading data must also be registered again.

## 1.6 General Tools

| Tool | Use |
|---|---|
| Phillips screwdriver | Removing/inserting screws |
| Flat bladed screwdriver | Removing/inserting screws |
| Precision Phillips screwdriver | Removing/inserting screws |
| Precision flat bladed screwdriver | Removing plastic tabs |
| Tweezers | Removing coil spring |
| Isopropyl alcohol (IPA) | Cleaning the cleaning location |
| Pliers, needle nose | Driving retaining ring |

## 1.7 Special Tools

| Tool | Use | Part No. |
|---|---|---|
| Grease (FLOIL G311S) | Apply to specified parts | TKC-0953 |
| Gap gauge (1.2mm) | For head gap adjustment | QY9-0016 |
| BJ cartridge (BC-20/BC-21) | For head gap adjustment, | ——— |
| Recommended paper | For re-registration of shading data | ——— |
| Cover opener | For opening the upper cover | HY9-0021 |

NOTE

**Cover opener**

The Cover opener (round-tip screwdriver) has been set as a special tool, but any precision screwdriver with a tip diameter of 1.5 mm or less would do instead. If using a substitute, be careful not to scratch any surfaces. See *page 1-45*

# 2. HOW TO CLEAN PARTS

## 2.1 Main Unit Outer Covers

Wipe with a dry, soft cloth.

## 2.2 Separation Roller

Open the operation panel, and wipe with a dry, soft cloth.

## 2.3 Separation Guide

Open the operation panel, and wipe with a dry, soft cloth.

## 2.4 Glass Window (contact sensor)

Remove the contact sensor ass'y and wipe with a dry cotton swab or soft cloth. Refer to *the Parts Catalog (supplied separately)* for the Disassembly Method.

## 2.5 Printer Platen

Open the Printer cover, and wipe with a cloth moistened with a little water.

**NOTE**

If the parts above are very dirty, wipe with a cloth moistened with IPA (isopropyl alcohol).

Do not use tissue paper. Dust from the tissue paper causes static electricity.

**Precautions when Using IPA**

When cleaning with IPA, take care to prevent the IPA from splashing high-temperature parts. If IPA splashes high-temperature parts, leave for at least three minutes to allow the IPA to evaporate.

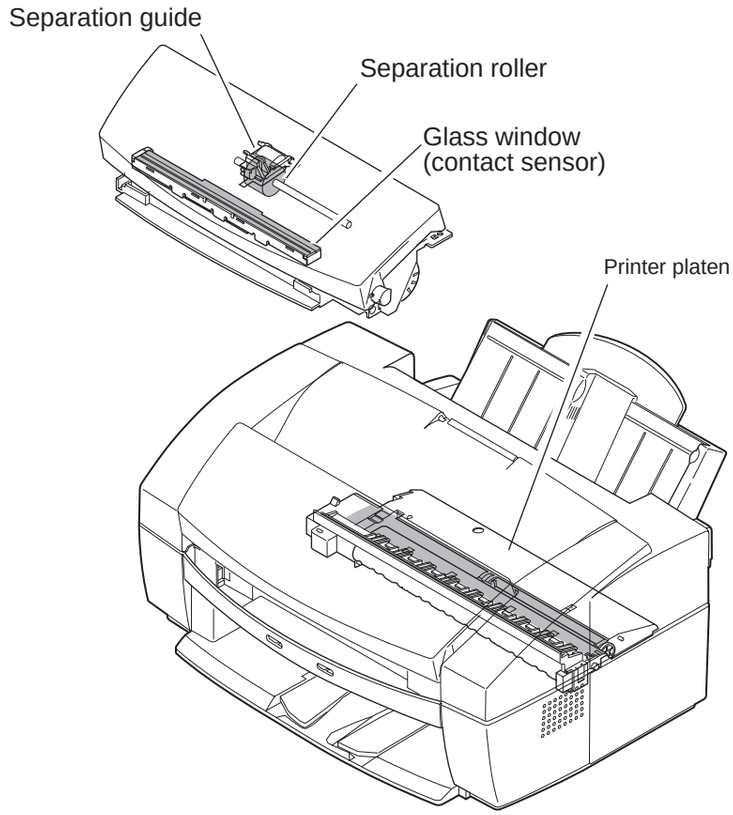



**Figure 3-1 Cleaning Location**

# 3. ADJUSTMENT

## 3.1 Shading Data Adjustment

**a) Overview**

If the SCNT board, lithium battery, or contact sensor has been replaced, **"DATA ERROR"** is displayed or the image scanned in AUTO HALFTONE mode contains black dots, the shading data for contact sensor correction may be damaged. Re-enter the shading data by following the procedure below.

**b) Tools required:**

Recommended paper.

**c) Procedure**

1) Follow the procedure below and select #3 CALIBRATION with the SPECIAL MODE.

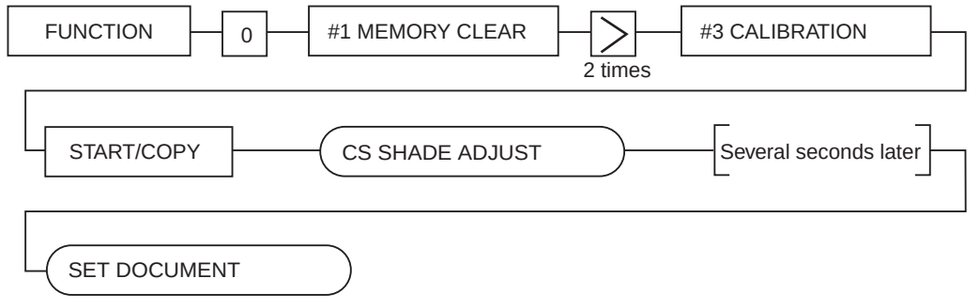



**Figure 3-2 Shading Data Adjustment Operation 1**

2) Place a white sheet of paper for scanning the shading data, and press the *START/COPY* button.

**Figure 3-3 Shading Data Adjustment Operation 2**

3) The paper is scanned and the shading data will be re-entered.
4) Execute copying operation and check the image.

## 3.2 Vertical Alignment Correction

### a) Overview

Vertical alignment during bi-directional printing can be corrected by adjusting the print starting position. No tools are required for this adjustment.

### b) Printing the test pattern

Follow the procedure below to print out the test pattern.

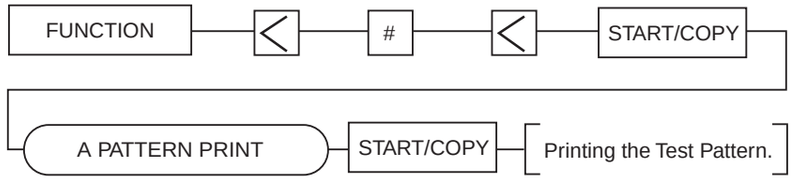



**Figure 3-4 Printing the Test Pattern**

**NOTE**

The test pattern can be printed only when Black BJ Cartridge (BC-20) and Color BJ Cartridge (BC-21) are used. Photo Color BJ Cartridge (BC-22) cannot be used.

### c) How to read the Test pattern

As shown in *Fig. 3-5*, the test pattern shows the SHQ, SHQ2 (Not used), HQ (normal mode), HS (economy mode) and uni-direction printing condition from the top. The respective vertical lines for HQ and HS can be moved left or right on the second row (of three rows). As shown in *Fig. 3-6*, adjust so that the vertical lines in the middle are correctly aligned.

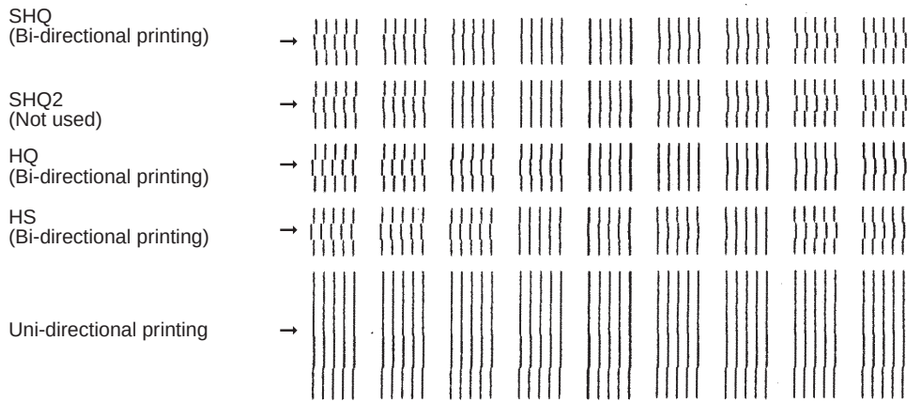



**Figure 3-5 Test Pattern Sample**

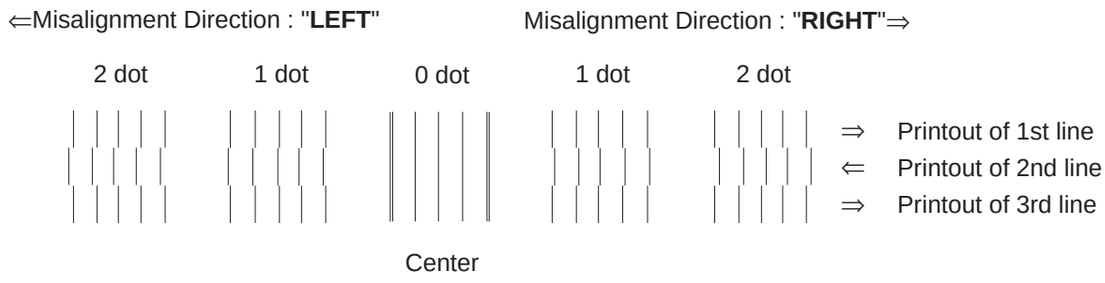



**Figure 3-6 Correct Test Pattern**

**d) Correction procedure**

The misaligned vertical lines in the middle, shown in *Fig. 3-7*, are described below.

(1) Check the correction direction for the 2nd line, and check the dot count. (In the example, a 2-dot correction to the right is necessary.)

(2) Determine the dot count required for the correction.
In SHQ, the dot count is roughly 4.55 times. (E.g., $2 \times 4.55 = 9$)
In HQ, the dot count is roughly 2.86 times. (E.g., $2 \times 2.86 = 6$)
In HS, the dot count is 2 times. (E.g., $2 \times 2 = 4$)

(3) As shown in *Fig. 3-8*, make the correction for all print mode. (The flowchart shows the procedure for making a 2-dot correction to the right for the all print mode, respectively. The actual display may look different from the figure.)

(4) After making the correction, print out the test pattern. If there is any misalignment, do the correction again.

Example: A 2-dot correction on the right is necessary

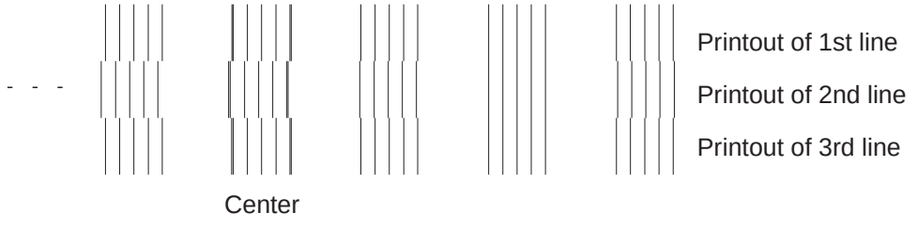
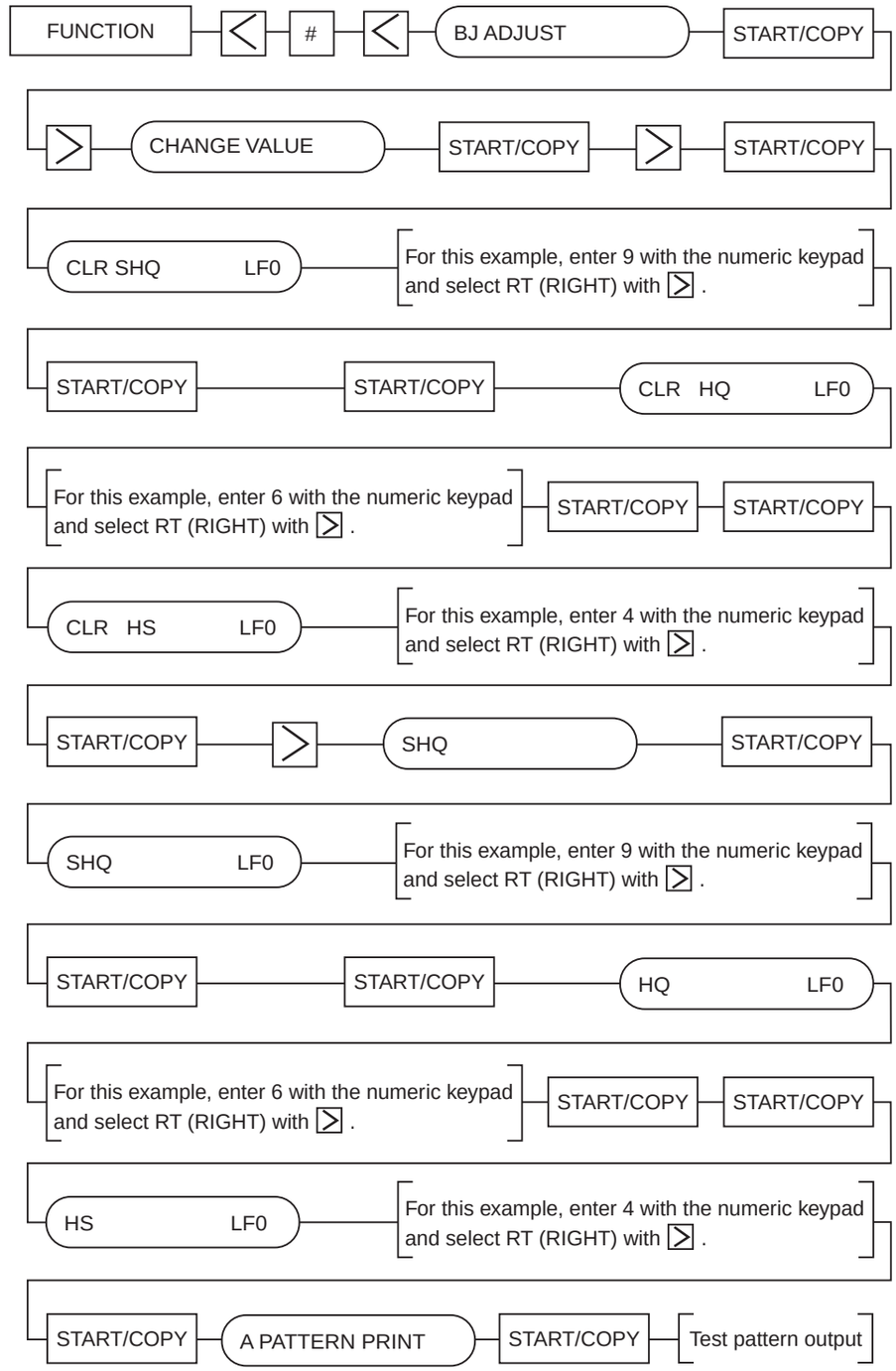



**Figure 3-7 Sample Test Pattern with Vertical Misalignment**

**NOTE**

All registration defaults are 0.
SHQ2 mode is not used in this model.




CLR : Color BJ Cartridge (BC-21)
LF : Left
RT : Right

**Figure 3-8 Vertical Line Misalignment Correction Procedure**

## 3.3 Head Gap Adjustment

### a) When adjustment is required

If the carriage guide frame fastened to the printer frame is repositioned, the head gap must be adjusted.

The screws are painted red to prevent them from being loosened.

**NOTE**

Only the head gap between the BJ cartridge's head face and platen needs to be adjusted (to approximately 1.2 mm) to ensure optimum print quality.
This adjustment is done by moving the carriage guide frame forward or back.
The head gap differs depending on the position of the paper thickness lever.
To adjust the head gap, move the paper thickness lever to the left (for plain paper printing with a black BJ cartridge) and set the head gap to approximately 1.2 mm.

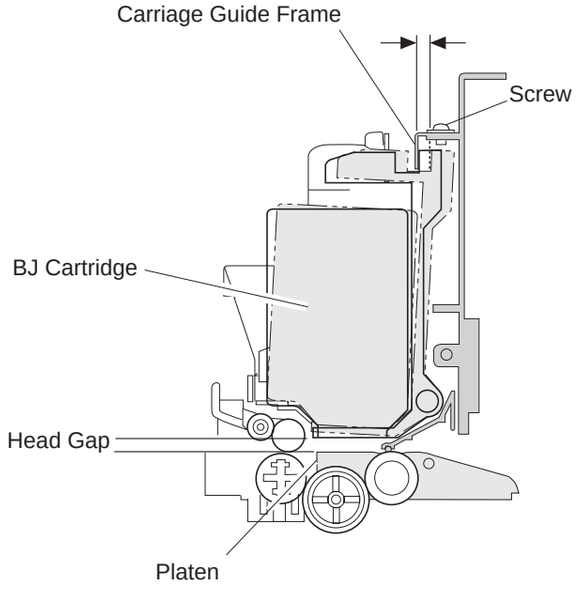



**Figure 3-9 Headgap**

**b) Required adjustment tools**

| Tool | Use |
|---|---|
| Gap gauge (1.2 mm) | For head gap measurement |
| Phillips screwdriver | Removing/inserting screws |
| BJ cartridge (BC-20) | For head gap measurement (During the adjustment, the head's nozzles will come into contact with the gap gauge. Therefore, do not use the customer's BJ cartridge. Also, since the BJ cartridge's weight will have some effect, always use a fresh BJ cartridge.) |

**c) Adjustment procedure**

**c-1) Adjustment preparation**

(1) Remove the upper cover. Refer to *the Parts Catalog* and remove the upper cover. Disassemble the main unit as shown in *Fig. 3-10*.
(2) Install a black BJ cartridge (for servicing) into the carriage.
(3) Push in the carriage guide frame as of the arrows and tighten screws A and B lightly.
(4) Move the carriage belt with your fingers to move the carriage to position A (center of platen).

Before making the adjustment, make sure the gap gauge is not deformed and no foreign particles are adhering to it and the platen.

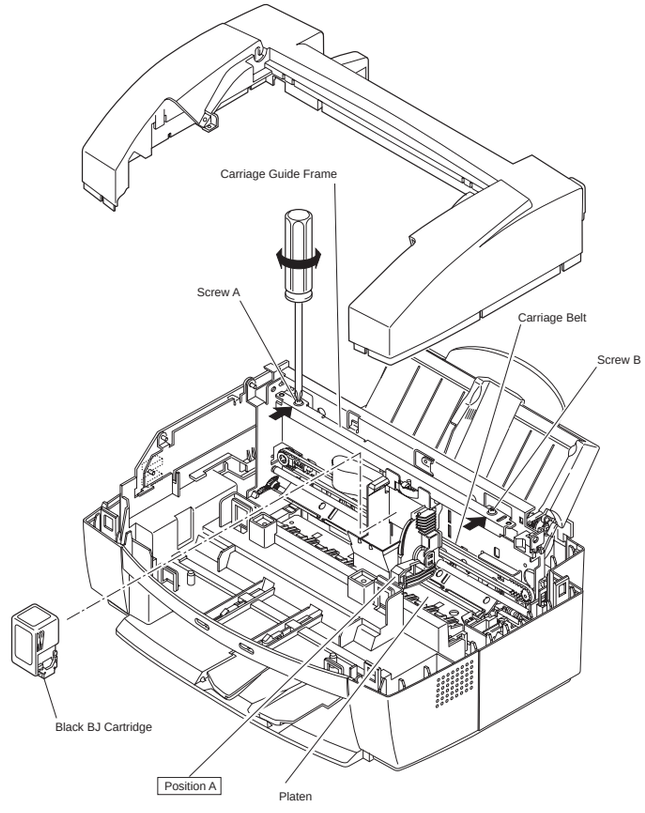



**Figure 3-10 Adjustment Preparation**

**c-2) Adjustment**

(1) Set the paper thickness lever to the right and place the gap gauge at position B.
(2) Move the carriage to position B.
(3) Set the paper thickness lever to the left.
(4) Loosen screw A until the carriage guide frame moves forward under the carriage's own weight with screw B as a pivot.
(5) Lightly push the screw A end of the carriage guide frame once or twice and check that the carriage guide frame moves around screw B as shown by the arrows.
If it does not return to the original position, screw B is too tight. And if it moves on the screw B end as well, screw B is too loose. Refasten the carriage guide frame lightly again and repeat the procedure from *C-1) Adjustment preparation*.
(6) Lightly tighten screw A.
(7) Put the paper thickness lever to the right and move the carriage to position A. Then place the gap gauge at position C.
(8) Move the carriage to position C.
(9) Put the paper thickness lever to the left.

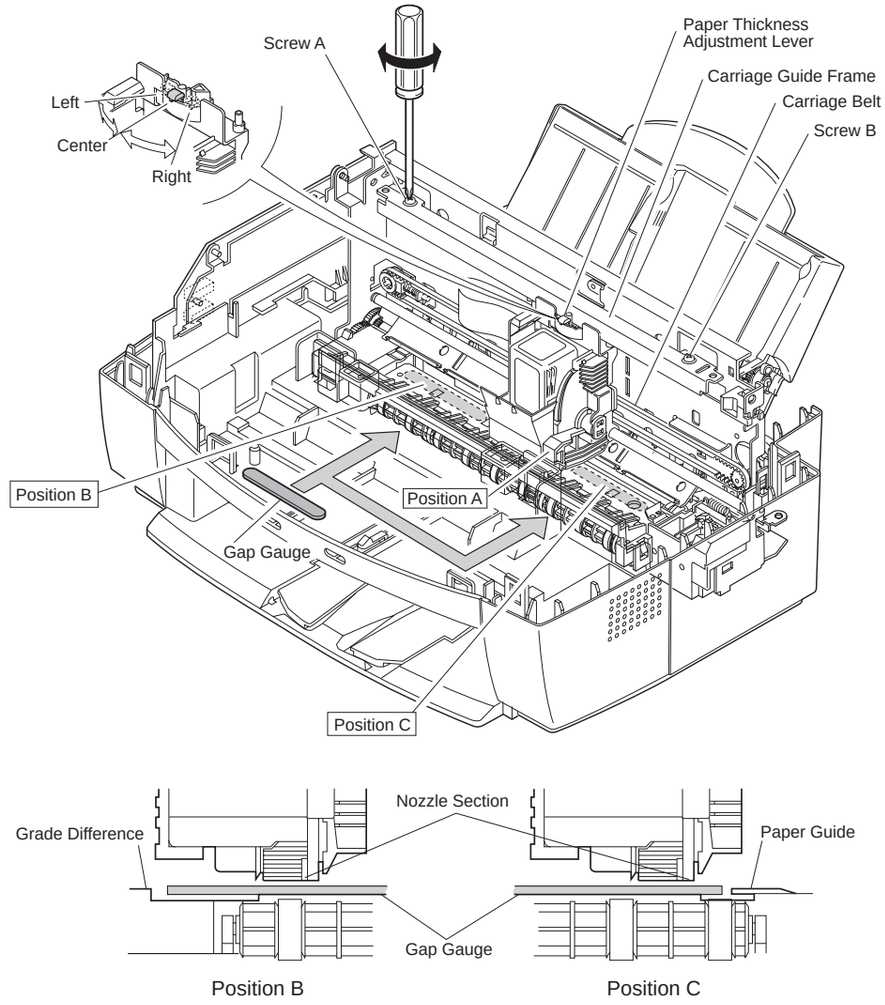



**Figure 3-11 Head Gap Adjustment (1)**

(10) Loosen screw B until the carriage guide frame moves forward under the carriage's own weight around screw A.
(11) Lightly push the screw B end of the carriage guide frame once or twice and check that the carriage guide frame moves around screw A as shown by the arrows.
If it does not return to its original position, screw A is too tight. And if it moves on the screw A end as well, screw A is too loose. Refasten the carriage guide frame lightly again and repeat the procedure from *C-1) Adjustment preparation*.
(12) Lightly tighten screw B.
(13) Push the paper thickness lever to the right and move the carriage to position A. Then place the gap gauge at position B.
(14) Repeat steps 2) through 13) twice.
(15) Tighten screws A and B alternately for final tightening.

Do not use your hand to move the carriage. It may cause the carriage guide frame to shift. To move the carriage, use the carriage belt instead.
On the platen, there is an elevated step and paper guide. If the gap gauge is placed on either part, an accurate measurement will not be obtained.

**d) Adjustment check**

After completing the adjustment, execute print test operation and check the image.

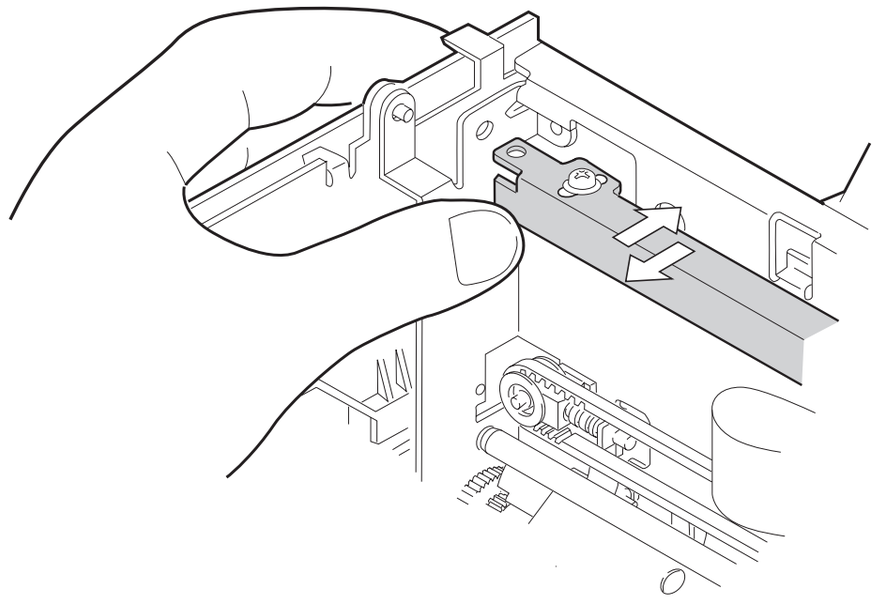


**Figure 3-12 Head Gap Adjustment (2)**

# 4. TROUBLESHOOTING

## 4.1 Troubleshooting Index

For troubleshooting, use the troubleshooting index below to investigate the cause of the problem and refer to the specified page for countermeasures.

**Problem**

- **General errors** **Page 3-26.**
  - The unit does not power on. (Evaluation criteria: Look at the unit in question.)
  - The display looks abnormal. (Evaluation criteria: Check it with the operation panel test.)
  - The keys do not work. (Evaluation criteria: Check it with the operation panel test.)
  - No sound from the speaker

- **Errors shown on the display (Evaluation criteria: Look at the unit in question.)**
  - The error message can be checked. **Page 3-15.**
  - The error code can be checked. **Page 3-19.**

- **Printing problem (Evaluation criteria: Test printing is no good.)**
  - The paper is not fed properly. **Page 3-27.**
    The paper feed motor does not run.
    The paper is not picked up from the auto sheet feeder.
  - The printing operation is abnormal. **Page 3-27.**
    Nothing is printed.
    The carriage motor does not run.
  - Printing quality error **Page 3-28.**
    (Evaluation criteria: Look at the printing result.)
    Print is not clear.
    Blurred or smudged characters.
    Smudges appear on back of printed page.
    Irregular print quality.
    Print head needs cleaning.
    Horizontal white stripes appear on some entirely black parts of the print.

- **Scanning problem (Evaluation criteria: Test printing is good, but the copied image is no good.)**
  - The document is not fed. **Page 3-29.**
    The document feed motor does not run.
    The document slips against the rollers.
    The document does not separate.
    Faulty scanner unit's sensors
  - The scanning image is abnormal. **Page 3-30.**
    Nothing is printed.
    The image has vertical stripes.
    The image has thick vertical stripes.
    The half-tone image contains black dots.

## 4.2 Errors Shown on the Display

### 4.2.1 User error message

Look for the applicable error message and execute the appropriate countermeasures.

**"BUSY/NO SIGNAL" (#005/#018)**

**Cause:** The receiving fax did not answer within 35 seconds. (T1 timer over)
**Solution:** Contact the other party and have them check their fax.You can try to send the document manually. For an overseas call, add pauses to the registered number.
**Cause:** The touch tone/rotary pulse setting on your fax is incorrect.
**Solution:** Set your fax to the setting that matches your telephone line.
**Cause:** The other party is not using a G3 machine.
**Solution:** Contact the other party and have them send or receive the document using a G3 machine.
**Cause:** The other party's fax is not working.
**Solution:** Contact the other party and have them check their fax.
**Cause:** The telephone number you dialed is busy.
**Solution:** Try sending the document at a later time.

**"CHECK DOCUMENT" (#001)**

**Cause :** Document jam. This is displayed when the document sensor detects paper, but the document edge sensor cannot detect the leading edge of the document with 15 seconds from the start of the feed operation.
**Solution:** Clear the document jam.

**"CHECK PAPER"**

**Cause:** The size of the paper loaded in the paper cassette is different from the paper size set by the MultiPASS Desktop Manager of Setup menu.
**Solution:** Set the correct paper size in the "FAX PRINTER SETUP" setting.

**"CHECK PRINTER" (##332~##337, ##342, ##345, ##346 and ##348)**

**Cause:** The printer's internal unit has malfunctioned.
**Solution:**
(1) Remove the jammed paper. (Check the paper end sensor is OFF.)
(2) Press *STOP* button.
(3) Reinstall the Cartridge.
(4) Turn the power off and on.
(5) Set the service data #1 SSSW SW01 bit 0 to "1" and check the service code. Refer to the countermeasures for that error code. (##342: Refer to *Page 3-24*.)

**"DATA ERROR"**

**Cause:** The registration data in the SRAM was destroyed and a checksum error occurred due to a dead lithium battery or SRAM failure.

**Solutions:** (1) Press the *START/COPY* button, and turn the power off and on again.
(2) Replace the lithium battery.
(3) Replace the SCNT board.

**"DOC. TOO LONG" (#003)**

**Cause:** The document is longer than 39.4"(1m).

**Solution:** Use a copy machine to make a reduced copy of the document. Then send again.

**Cause:** It took more than 32 minutes to send or copy a document. It took more than 32 minutes to receive a document.

**Solution:** Divide the document and send or copy each part separately. Contact the other party. Have them divide the document and send each part separately.

**"HANG UP PHONE"**

**Cause:** The handset or the extension telephone is off the hook.

**Solution:** Put the handset or the extension telephone back on the hook.

**"PUT IN CARTRIDGE"**

**Cause:** The BJ cartridge is not set.

**Solution:** Set the BJ cartridge.

**"MEMORY FULL" (#037)**

**Cause:** The fax's memory is full because it has received too many documents.

**Solutions:** (1)Print out any documents which are stored in memory. Then start the operation again.
(2)If the memory contains any facsimiles you don't need, delete them.
(3)You cannot receive a fax was scanned with fine graphic images.

**Cause:** The fax's memory is full because you tried to send too many pages at once.

**Solution:** Divide the document and send each part separately.

**"NO ANSWER" (#005)**

**Cause:** The receiving fax machine does not answer.

**Solution:** Make sure you dialed the correct number. Try again later.

**"CARTRIDGE JAMMED"**

### Printing position correction failed

**Cause:** Carriage movement prevented by one of the following.
Damaged shaft.
Parts deformed. (Carriage or guide frame)
Insufficient grease.

**Countermeasure:** Replace the shaft.
Replace the deformed parts.
Apply more grease.

**Cause:** Bi-directional print displacement correction failed because the carriage motor is out of step, or some similar reason.

**Countermeasure:** Replace the carriage motor.

### Home position error

**Cause:** Foreign body in carriage section.

**Countermeasure:** Open printer cover, and remove foreign body.

**Cause:** Loose carriage belt.

**Countermeasure:** Replace carriage belt.

**Cause:** Guide frame home position detection tabs is damaged or bent parts.

**Countermeasure:** Replace the damaged or bent parts.

**Cause:** Carriage motor does not work.

**Countermeasure:** (1) Switch power OFF/ON.
(2) Replace carriage motor.

**Cause:** Carriage position cannot be detected. (Home position sensor breakdown, or BJ controller malfunction)

**Countermeasure:** (1) Switch power OFF/ON.
(2) Replace carriage cable with one that has a home position sensor attached.
(3) Replace the PCNT board.

**NOTE**

This error message means the same as service error codes ##338 and ##340. When this error occurs in this model, it is not treated as a service error, but as a user error, and the error message is displayed.

**"NO RX PAPER" (#012)**

**Cause:** The receiving fax machine declares no paper in DIS, or its memory is full.

**Solution:** Contact the other party, and ask them to put paper in their machine, or to clear their fax machine's memory.

**"NO TEL #" (#022)**

**Cause:** The button you pressed has no number registered for One-Touch Speed Dialing, Coded Speed Dialing, or Group Dialing.

**Solution:** Print a list of registered numbers and make any corrections needed, then try again.

**"NOT AVAILABLE NOW"**

**Cause:** One-touch or coded speed dial already registered.

**Solution:** Check the contents of the one-touch or coded speed dialling registration, then try again.

**"REC. PAPER JAM" (#009)**

**Cause:** Paper jam.

**Solution:** Clear the paper jam.

**"CHANGE CARTRIDGE" (#052)**

**Cause:** The BJ cartridge has run out of ink.

**Solution:** Replace the BJ cartridge.

**"WAIT COOLING"**

**Cause:** The BJ cartridge is hot.

**Solution:** Wait until the message disappears.

**"START AGAIN"**

**Cause:** An error occurred on the phone line or in the system.

**Solution:** Start the procedure again from the beginning.

**"LOAD PAPER" (#009)**

**Cause:** The fax is out of paper.

**Solution:** Add more paper to the paper cassette. Make sure the stack is below the limit mark.

### 4.2.2 Error codes

**a) Service error code output**

When service data #1 SSSW SW01 bit 0 is set to "1", then service error codes are printed on the activity management reports, reception result reports and error transmission reports, when communication ends in an error. Also, the following is displayed, when an error occurs.

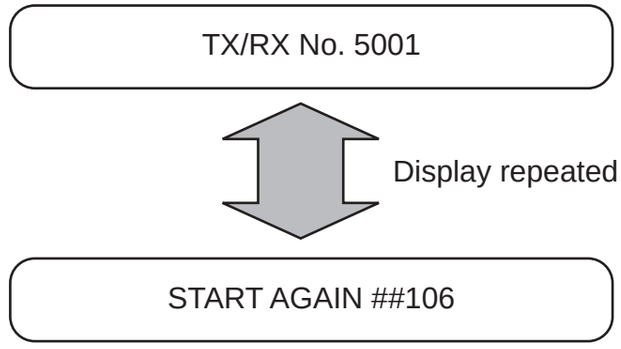



**Figure 3-13 Service Error Code Display**

**b) Error code countermeasures**

From item c), all the error codes which the unit can display are listed. The separate *G3 Facsimile Error Code List (Rev. 1)* does not specify the countermeasures for resolvable error codes. Also refer to this list when an error code appears.

The *G3 Facsimile Error Code List (Rev. 1)* does not specify countermeasures for all error codes. The countermeasures that are specified in the *G3 Facsimile Error Code List (Rev. 1)* are included here as specific countermeasures for your reference.

- **Increase the transmission level**

  Set service data #2 MENU Parameter No.07 to 0 (dBm).
- **Decrease the transmission level**

  Set service data #2 MENU Parameter No.07 to -15 (dBm).
- **Echo measures**

  Change the following bit switches of service data #1 SSSW SW03.

  Bit 4:1 Ignore the first DIS signal sent by the other fax machine.

  0 Do not ignore the first DIS signal sent by the other fax machine.

  Bit 5:1 Transmit a tonal signal (1850 or 1650 Hz) when the other fax machine sends a DIS signal.

  0 Do not transmit a tonal signal when the other fax machine sends a DIS signal.

  Bit 6:1 Transmit a 1850-Hz tonal signal when bit 5 is 1.

  0 Transmit a 1650-Hz tonal signal when bit 5 is 1.

  Bit 7:1 Transmit a tonal signal before sending a CED signal.

  0 Do not transmit a tonal signal before sending a CED signal.

**• EPT (Echo Protect Tone)**

Change service data #1 SSSW SW03 bit 1.

Bit 1:1 Transmit an echo protect tone.

0 Not transmit an echo protect tone.

**• Adjust NL equalizer.**

Set service data #2 MENU Parameter No.05 to "ON".

**• Reduce the transmission start speed.**

Reduce the transmission speed by changing user data "SYSTEM SETTINGS" "TX START SPEED".

**• Loosen the TCF judgment standard.**

Not available for this fax.

**• Loosen the RTN transmission conditions.**

Change service data #3 NUMERIC Param. Parameter No.02 to 04.

No.02 Percentage of errors in all lines : Set close to 99%.

No.03 Number of lines of burst condition : Set close to 99 lines.

No.04 Lines below the burst condition : Set close to 99 times.

**• Increase the no-sound time after CFR reception.**

Change service data #1 SSSW SW04 bit 4 to "1".

Bit 4:1 Time when the low-speed signal is ignored after sending a CFR signal: 1500 ms

0 Time when the low-speed signal is ignored after sending a CFR signal: 700 ms

### c) ERROR CORD LIST for MultiPASS C3000

New error codes indicate *"new"* in this list.

**• User error code**

| No. | Tx or Rx | Definition |
|---|---|---|
| #001 | [ TX ] | Paper Jam |
| #003 | [ TX/RX ] | Copy Page, Communication Time Over |
| #005 | [ TX/RX ] | Initial ID (T1) Time Over |
| #009 | [ RX ] | Recording Paper Jam or Out of Paper |
| #011 | [ RX ] | Polling Error |
| #012 | [ TX ] | Other party Out of Paper |
| #018 | [ TX/RX ] | Automatic Dialing Error |
| #021 | [ RX ] | DCN during Polling Rx |
| #022 | [ TX ] | Call Failure |
| #037 | [ RX ] | Image Memory Full |
| #039 | [ TX ] | Closed Network Tx Failure |
| #052 | [ RX ] | Image memory full by no ink error |
| #995 | [ TX/RX ] | Memory Communication reservation cancellation |

**• Service error code**

| No. | Tx or Rx | Definition |
|---|---|---|
| ##100 | [ TX ] | Excessive Repeat Protocol during Rx |
| ##101 | [ TX/RX ] | Modem Speed Different from Other Party |
| ##102 | [ TX ] | Fall Back Failure during Tx |
| ##103 | [ RX ] | Fail to Detect EOL for 5 Seconds (15 seconds for CBT) during Rx |
| ##104 | [ TX ] | RTN or PIN Received during Tx |
| ##106 | [ RX ] | Fail to Receive Protocol for 6 Seconds when Waiting for Protocol during Rx |
| ##107 | [ RX ] | Fall Back Failure on Tx Side during Rx |
| ##109 | [ TX ] | Receive Signals Other than DIS, DTC, FTT, CFR or CRP after DCS Tx and Exceed the Number of Protocol re-transmissions during Tx |
| ##111 | [ TX/RX ] | Memory error |
| ##114 | [ RX ] | RTN Transmission during Reception |
| ##200 | [ RX ] | Fail to Detect Picture Rx Carrier for 5 Seconds during Rx |
| ##201 | [ TX/RX ] | DCN received Other than Normal Binary Protocol |
| ##204 | [ TX ] | Receive DTC without Tx Data |
| ##220 | [ TX/RX ] | System Error (main program runaway) |
| ##224 | [ TX/RX ] | Abnormal Protocol during G3 Communication |
| ##226 | [ TX/RX ] | Stack Pointer Not within RAM Range |
| ##229 | [ RX ] | Recording Unit Locked for 1 Minute |
| ##232 | [ TX ] | ENCODE Control Unit Malfunction |
| ##237 | [ RX ] | DECODE Control Unit Malfunction |
| ##238 | [ RX ] | PRINT Control Unit Malfunction |
| ##261 | [ TX/RX ] | System Error between Modem and SCNT |
| ##280 | [ TX ] | Excessive Repeat Protocol Command during Tx |
| ##281 | [ TX ] | Excessive Repeat Protocol Command during Tx |
| ##282 | [ TX ] | Excessive Repeat Protocol during Tx |

| No. | Tx or Rx | Definition |
|---|---|---|
| ##283 | [ TX ] | Excessive Repeat Protocol during Tx |
| ##284 | [ TX ] | DCN Reception after TCF Transmission |
| ##285 | [ TX ] | DCN Reception after EOP Transmission |
| ##286 | [ TX ] | DCN Reception after EOM Transmission |
| ##287 | [ TX ] | DCN Reception after MPS Transmission |
| ##288 | [ TX ] | Receive Signals Other than PIN, PIP, MCF, RTP or RTN after EOP Transmission |
| ##289 | [ TX ] | Receive Signals Other than PIN, PIP, MCF, RTP or RTN after EOM Transmission |
| ##290 | [ TX ] | Receive Signals Other than PIN, PIP, MCF, RTP or RTN after MPS Transmission |
| ##332 | [TX/RX ] | Printer control DRAM check error |
| ##333 | [TX/RX ] | Printer control ROM check error |
| ##334 | [TX/RX ] | Printer control EEPROM check error |
| ##335 | [TX/RX ] | Data transmission error between the system control section and printer control section |
| ##336 | [TX/RX ] | BJ head abnormal temperature error |
| ##337 | [RX ] | BJ head temperature sensor error |
| ##342 | [TX/RX ] | Cleaning absorption waste ink capacity full |
| ##345 | [TX/RX ] | BJ cartridge head cleaning error |
| ##346 | [TX/RX ] | Inside temperature error |
| ##348 | [TX/RX ] | Ink detection sensor error |
| ##750 | [ TX ] | Exceed Repeat Protocol Due to Failure to Receive Significant Signals after Transmitting PPS-NULL during ECM Tx |
| ##752 | [ TX ] | Receive DCN after PPS-NULL Transmission during ECM Tx |
| ##753 | [ TX ] | Exceed Protocol Retransmission Limit or T5 Time (60 seconds) after PPS-NULL Transmission during ECM Tx |
| ##754 | [ TX ] | Exceed Retransmit Protocol after PPS-NULL Transmission during ECM Tx |
| ##755 | [ TX ] | Exceed Protocol Retransmission Limit Due to Failure to Receive Significant Signals after PPS-MPS Transmission during ECM Tx |
| ##757 | [ TX ] | Receive DCN after PPS-MPS Transmission during ECM Tx |
| ##758 | [ TX ] | Exceed Protocol Retransmission Limit or T5 Time (60 seconds) after PPS-MPS Transmission during ECM Tx |
| ##759 | [ TX ] | Exceed Retransmit Protocol after PPS-MPS Transmission during ECM Tx |
| ##760 | [ TX ] | Exceed Protocol Retransmission Limit Due to Failure to Receive Significant Signals after PPS-EOM Transmission during ECM Tx |
| ##762 | [ TX ] | Receive DCN after PPS-EOM Transmission during ECM Tx |
| ##763 | [ TX ] | Exceed Protocol Retransmission Limit or T5 Time (60 seconds) after PPS-MPS Transmission during ECM Tx |
| ##764 | [ TX ] | Exceed Retransmit Protocol after PPS-EOP Transmission during ECM Tx |

| No. | Tx or Rx | Definition |
|---|---|---|
| ##765 | [ TX ] | Exceed Protocol Retransmission Limit Due to Failure to Receive Significant Signals after PPS-EOP Transmission during ECM Tx |
| ##767 | [ TX ] | Receive DCN after PPS-EOP Transmission during ECM Tx |
| ##768 | [ TX ] | Exceed Protocol Retransmission Limit or T5 Time (60 seconds) after PPS-EOP Transmission during ECM Tx |
| ##769 | [ TX ] | Exceed Retransmit Protocol after PPS-EOP Transmission during ECM Tx |
| ##770 | [ TX ] | Exceed Repeat Protocol Limit Due to Failure to Receive Significant Signals after Transmitting EOR-NULL during ECM Tx |
| ##772 | [ TX ] | Receive DCN after EOR-NULL Transmission during ECM Tx |
| ##773 | [ TX ] | Exceed Protocol Retransmission Limit or T5 Time (60 seconds) after EOR-NULL Transmission during ECM Tx |
| ##774 | [ TX ] | Receive ERR after EOR-NULL Transmission during ECM Tx |
| ##775 | [ TX ] | Exceed Protocol Retransmission Limit Due to Failure to Receive Significant Signals after EOR-MPS Transmission during ECM Tx |
| ##777 | [ TX ] | Receive DCN after EOR-MPS Transmission during ECM Tx |
| ##778 | [ TX ] | Exceed Protocol Retransmission Limit or T5 Time (60 seconds) after EOR-MPS Transmission during ECM Tx |
| ##779 | [ TX ] | Receive ERR after EOR-MPS Transmission during ECM Tx |
| ##780 | [ TX ] | Exceed Protocol Retransmission Limit Due to Failure to Receive Significant Signals after EOR-EOM Transmission during ECM Tx. |
| ##782 | [ TX ] | Receive DCN after EOR-EOM Transmission during ECM Tx |
| ##783 | [ TX ] | Exceed Protocol Retransmission Limit or T5 Time (60 seconds) after EOR-EOM Transmission during ECM Tx |
| ##784 | [ TX ] | Receive ERR after EOR-EOM Transmission during ECM Tx |
| ##785 | [ TX ] | Exceed Protocol Retransmission Limit Due to Failure to Receive Significant Signals after EOR-EOP Transmission during ECM Tx. |
| ##787 | [ TX ] | Receive DCN after EOR-EOP Transmission during ECM Tx |
| ##788 | [ TX ] | Exceed Protocol Retransmission Limit or T5 Time (60 seconds) after EOR-EOP Transmission during ECM Tx |
| ##789 | [ TX ] | Receive ERR after EOR-EOP Transmission during ECM Tx |
| ##790 | [ RX ] | Transmit ERR after EOR-Q Reception during ECM Rx |
| ##791 | [ TX/RX ] | Receive Non-Significant Signals during ECM Mode Procedures |
| ##792 | [ RX ] | Fail to Detect PPS-NULL between Partial Pages during ECM Rx |
| ##793 | [ RX ] | Time Over Due to Failure to Receive Valid Frame during High Speed Signal Rx upon ECM Rx |
| ##794 | [ TX ] | Receive All 0 PPR during ECM Tx |
| ##795 | [ TX/RX ] | Trouble in the decoding processing during communication |

**e) New error codes and recovery methods**

There is no new error code in this model.

Note, however, the following supplementary information, as the machine requires different actions than the existing models to correct:

**##342 Cleaning absorption waste ink capacity full**

**Solution:** Unlike errors that trigger the "CHECK PRINTER" message, This error is programmed so that it cannot be cleared using the *STOP* button. Replace the waste ink absorber as follows in the error occurs:

(1) Select 3. INK ABS CAPA under #7 PRINTER in service mode, and the counter to 0.

(2) When 4.PRINTER RESET appears under #7 PRINTER in response to step (1), press the *START/COPY* button and the * button to reset the printer.
The error will be cleared, and the image stored in memory will automatically be printed.

(3) Check to make sure that no image exist in memory; then, turn off the power, remove the appropriate parts, and replace the waste ink absorber.

## 4.3 Errors not Shown on the Display

### 4.3.1 General errors

**• The unit does not turn on. (Evaluation criteria: Look at the actual unit.)**

(1) Check the power cord connection.
(2) Check the connection between the PCNT board (J4) and power supply unit.
(3) Check the connection between the SCNT board (J14, J15) and PCNT board (J5, J6)
(4) Check the power supply unit's fuse (F1).
(5) Replace the power supply unit.

**• The display looks abnormal. (Applicable test mode: Operation panel test)**

**Nothing is displayed.**

(1) Check the connection between the Operation panel unit and SCNT board (J21).
(2) Replace the Operation panel unit.
(3) Replace the SCNT board.

**Part of the LCD panel does not display anything.**

(1) Check for LCD problems with the test mode.
(2) Check the connection between the Operation panel unit and SCNT board (J21).
(3) Replace the Operation panel unit. (Faulty LCD)
(4) Replace the SCNT board.

**• The keys do not work. (Applicable test mode: Operation panel test)**

(1) If the test mode can be used, check for faulty keys.
(2) Check the connection between the Operation panel unit and SCNT board (J21).
(3) Replace the Operation panel unit.
(4) Replace the SCNT board.

**• No sound from the speaker**

(1) Check the connection of the speaker and PCNT board (J10).
(2) Replace the speaker.
(3) Replace the PCNT board.

### 4.3.2 Printing problem

**• Faulty printing (Evaluation criteria: Test print is no good.)**

**• The paper is not fed correctly. (Evaluation criteria: Look at the actual unit.)**

**The Paper feed motor does not run.**

(1) Check the connection from the paper feed motor to the PCNT board (J3).
(2) Check the paper feed motor's resistance. 55 Ω/1 phase is normal. (*Fig. 3-14*)
(3) Replace the paper feed motor.
(4) Replace the PCNT board.
(5) Replace the SCNT board.

**The paper is not picked up from the auto sheet feeder.**

(1) Check parts in the paper feed motor drive switching mechanism for abnormalities.
(2) Make sure that the ASF gear is attached correctly. (*Fig. 3-14*)
(3) Replace pickup roller ass'y.
(4) Replace PCNT board (Faulty PRS or PES).
(5) SCNT board.

**• The printing operation is abnormal.**

**Nothing is printed.**

(1) Remove the BJ cartridge and re-install it.
(2) Execute cleaning five times, and try printing again.
(3) Replace the BJ cartridge.

**The carriage motor does not run.**

(1) Check the connection from the carriage motor to the PCNT board (J2).
(2) Check the carriage motor's resistance. 9 Ω/1 phase is normal. (*Fig. 3-14*)
(3) Replace the carriage motor.
(4) Replace the PCNT board.
(5) Replace the SCNT board.

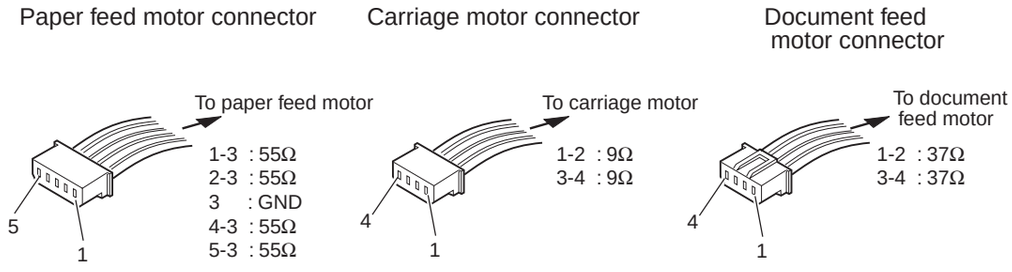



**Figure 3-14 Paper Feed Motor/Carriage Motor/Document Feed Motor Connector**

**• Printing quality error (Evaluation criteria: Check the test print image's faults.)**

**• Print is not clear**

(1) Paper has a correct side for printing. If the print quality is not as clear as you would like it to be, try turning the paper over and printing on the other side.

**• Blurred or smudged characters**

(1) If the printed characters are blurred or smudged, make sure you are using the recommended paper.

**• Smudges appear on back of printed page**

(1) If ink happens to get on the printer's platen, the back side of the printed page will have smudge marks. If this occurs, clean the platen by feeding a few sheets of paper through the printer.

**• Irregular print quality**

(1) If white streaks appear on the printed page or dots are missing in the printed output, clean the BJ head. The printer automatically cleans the BJ head when you follow these steps:
Press the *FUNCTION* button and select *CLEANING* menu.

**• Print head needs cleaning**

(1) Paper dust or ink may get clogged in an ink nozzle in the BJ cartridge. Performing the BJ head cleaning procedure should clear up this problem.
The printer automatically cleans the BJ head when you follow these steps:
Press the *FUNCTION* button and select *CLEANING* menu.

**• Horizontal white stripes appear on some entirely black parts of the print**

(1) Carry out nozzle cleaning on the BJ cartridge five times with the cleaning operation, then visually check the test print for non-discharge of ink from nozzles. (*Fig. 3-15*)
(2) Remove and reinstall the BJ cartridge.
(3) Replace the BJ cartridge.
(4) Check the connection of the carriage ribbon cable and the PCNT board (J1).
(5) Replace the carriage ribbon cable.
(6) Replace the PCNT board.

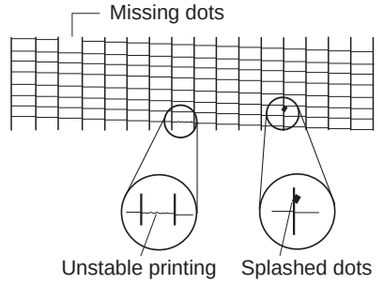



**Figure 3-15 Defective Pattern (Sample)**

### 4.3.3 Scanning problem

**• Faulty scanning (Evaluation criteria: Test print is good, but the copied image is no good.)**

**• The document is not fed.**

**The document feed motor does not run. (Evaluation criteria: Check it visually.)**

(1) Check the connection from the document feed motor to the PCNT board (J9).
(2) Check the document feed motor's resistance. 37 Ω/1 phase is normal. (*Fig. 3-14*)
(3) Replace the document feed motor.
(4) Replace the PCNT board.
(5) Replace the SCNT board.

**The document slips against the rollers. (Evaluation criteria: Check it visually. Stretched copy image.)**

(1) See *page 3-4* and clean the document reading section.
(2) Replace the reading section's rollers.

**The document does not separate. (Evaluation criteria: Check it visually.)**

(1) Check whether the reading motor is driving all the rollers. (Check for any damaged gears or foreign matter stuck inside.)
(2) See *page 3-4* and clean the separation roller and separation guide.
(3) Replace the separation roller and separation guide.

**Faulty scanner unit's sensors (Evaluation criteria: The placed document or transported document is not detected.)**

(1) Check for any faulty sensors while executing the copying operation and test mode.
(2) Check the connection from operation panel unit to the SCNT board (J21).
(3) Replace operation panel unit.
(4) Replace the SCNT board.

- **The reading image is abnormal. (Evaluation criteria: Check the copy image's faults.)**

  **Nothing is printed.**

  (1) Check the connection between the contact sensor and SCNT board (JCS1).
  (2) Replace the contact sensor assembly.
  (3) Replace the SCNT board.

  **The image has vertical stripes.**

  (1) Clean the contact sensor's reading glass.
  (2) Check the connection between the contact sensor and SCNT board (JCS1).
  (3) Replace the contact sensor assembly.

  **The image has thick vertical stripes.**

  (1) Clean the contact sensor's reading glass.
  (2) Make sure the document is not slanted.
  (3) Check the connection between the contact sensor and SCNT board (JCS1).
  (4) Replace the contact sensor assembly.

  **The halftone image contains black dots.**

  (1) Clean the contact sensor's reading glass.
  (2) Check the connection between the contact sensor and SCNT board (JCS1).
  (3) Re-enter the contact sensor's shading data. See *Page 3-6*.
  (4) Replace the contact sensor assembly.
  (5) Replace the SCNT board.

# 5. SERVICE SWITCHES

## 5.1 Hardware Switches

There is no service hardware switch on the Circuit board.

## 5.2 Service Data Setting

Service data can be checked and changed with items on display menus. The default values of the SSSW/parameters available in this fax machine are shown in *this Chapter, 5.2.3 Service data setting* in this manual. The SSSW/parameters given in the previous product-specific manual are explained in the *G3 Facsimile Service Data Handbook*. The new switches for this model are described in *this Chapter, 5.2.3 Service data setting*.

### 5.2.1 Service data overview

The service data menu items are divided into the following nine blocks.

**#1 SSSW (Service Soft Switch settings)**

These setting items are for basic fax service functions such as error management, echo countermeasures, and communication trouble countermeasures.

**#2 MENU (MENU switch settings)**

These setting items are for functions required during installation, such as NL equalizer and transmission levels.

**#3 NUMERIC Param. (NUMERIC parameter settings)**

These setting items are for inputting numeric parameters such as the various conditions for the FAX/TEL switching function.

**#4 NCU (NCU settings)**

These setting items are for telephone network control functions such as the selection signal transmission conditions and the detection conditions, for the control signals sent from the exchange.

**#5 TYPE (TYPE setting)**

The type setting makes the service data conform to a specific country communications standards. There is only one setting item in this block.

**#6 GENESIS (UHQ function setting)**

These setting items are for scanned image processing such as edge enhancement and error diffusion processing.

**#7 PRINTER (PRINTER function settings)**

These setting items are for basic printer service functions such as the reception picture reduction conditions. Also there is an item for resetting the printer section without switching the power off-on.

**#8 CLEAR (data initialization mode)**

Various data are initialized by selecting one of these setting items. There is a setting item for checking/inputting the total number of pages printed and total number of pages scanned by this fax.

**#9 ROM (ROM management)**

ROM data such as the version number and checksum are displayed.

**#10 REPORT (Service report output function)**

Service report output function.

## 5.2.2 Service data registration/setting method

Service data can be registered/set by the following operations:

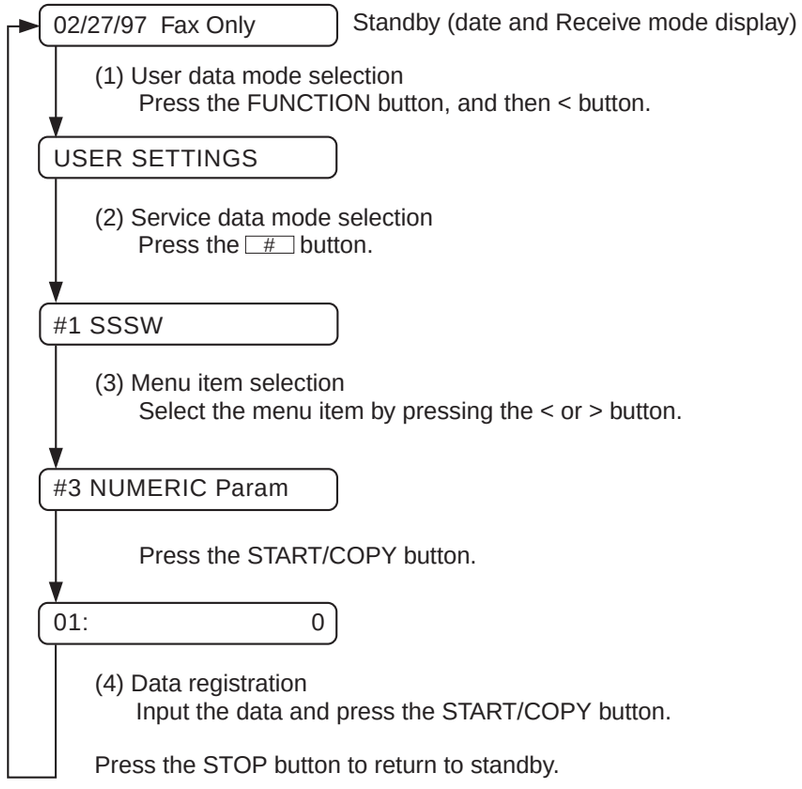

02/27/97 Fax Only
Standby (date and Receive mode display)
(1) User data mode selection
Press the FUNCTION button, and then < button.
USER SETTINGS
(2) Service data mode selection
Press the # button.
#1 SSSW
(3) Menu item selection
Select the menu item by pressing the < or > button.
#3 NUMERIC Param
Press the START/COPY button.
01: 0
(4) Data registration
Input the data and press the START/COPY button.
Press the STOP button to return to standby.

**Figure 3-16 Service Data Setting Method**

### 5.2.3 Service data setting

**Service data**

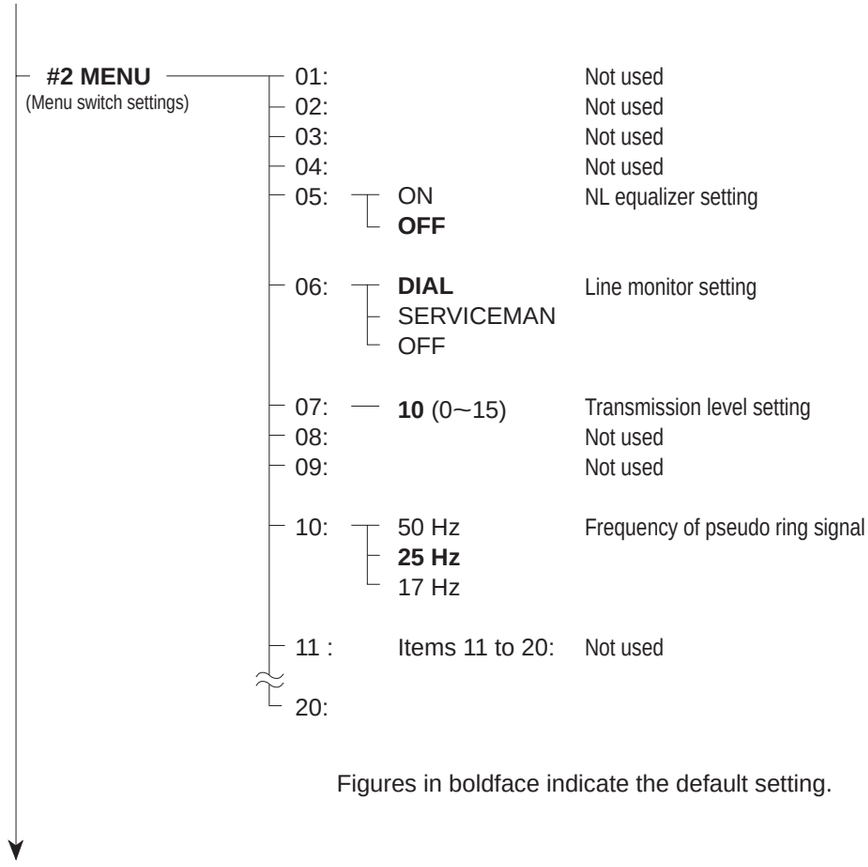
1 < ↔ 2 >

**#1 SSSW**
(Service soft switch setting)

| Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | |
|---|---|---|---|---|---|---|---|---|---|
| SW01 | – | – | – | – | 0 | – | 0 | 0 | Error management |
| SW02 | – | – | – | – | – | – | – | 0 | Memory clear list output setting |
| SW03 | 0 | 0 | 0 | 0 | – | – | 0 | – | Echo solution setting |
| SW04 | 1 | 0 | – | 0 | 0 | 0 | – | – | Communication trouble solution settings |
| SW05 | – | – | – | 0 | – | – | – | – | Standard function (DIS signal) setting |
| SW06 | – | 0 | 0 | 1 | – | 0 | – | – | Scan condition settings |
| SW07 | – | – | – | – | – | – | – | – | Not used |
| SW08 | – | – | – | – | – | – | – | – | Not used |
| SW09 | – | – | – | – | – | 0 | 0 | 0 | Communications result display function settings |
| SW10 | – | – | – | – | – | – | – | – | Not used |
| SW11 | – | – | – | – | – | – | – | – | Not used |
| SW12 | 0 | – | 0 | 0 | 0 | 0 | 1 | 0 | Page timer settings |
| SW13 | – | – | – | – | – | – | – | – | Not used |
| SW14 | – | – | – | – | – | – | – | – | Not used |
| SW15 | – | – | – | – | – | – | – | – | Not used |
| SW16 | – | – | – | – | – | – | – | – | Not used |
| SW17 | – | – | – | – | – | – | – | – | Not used |
| SW18 | – | – | – | – | – | – | – | – | Not used |
| SW19 | – | – | – | – | – | – | – | – | Not used |
| SW20 | – | 1 | – | – | – | – | – | – | Copy function settings |
| SW21 | – | – | – | – | – | – | – | – | Not used |
| SW22 | – | – | – | – | – | – | – | – | Not used |
| SW23 | – | – | – | – | – | – | – | – | Not used |
| SW24 | – | – | – | – | – | – | – | – | Not used |
| SW25 | – | – | – | – | – | – | 0 | 0 | Report display function settings |
| SW26 | 0 | 0 | – | – | – | – | – | – | Transmission function settings |
| SW27 | – | – | – | – | – | – | – | – | Not used |
| SW28 | – | – | – | – | – | – | – | – | Not used |
| SW29 | – | – | – | – | – | – | – | – | Not used |
| SW30 | – | – | – | – | – | – | – | – | Not used |

**Figure 3-17 Service Data (page 1)**

The switches marked "–" are not used. Do not change their settings.




Figures in boldface indicate the default setting.

**Figure 3-18 Service Data (page 2)**

No. 01 to 04, 08, 09, 11 to 20 are not used. Do not change their settings.

**#3 NUMERIC Param.**
(Numeric parameter settings)

| | Default | Range | |
|---|---|---|---|
| 01: | 0 | | Not used |
| 02: | 10 (10%) | (1~99) | RTN signal transmission condition (1) |
| 03: | 15 (15 lines) | (2~99) | RTN signal transmission condition (2) |
| 04: | 12 (12 times) | (1~99) | RTN signal transmission condition (3) |
| 05: | 0 | | Not used |
| 06: | 0 | | Not used |
| 07: | 0 | | Not used |
| 08: | 0 | | Not used |
| 09: | 6 (6 digits) | (1~20) | The number of digits in telephone number compared against TSI signal to be matched for restricted receiving function |
| 10: | 5500 (55 seconds) | (0~9999) | Line connection detection time (T0 timer) |
| 11: | 3500 (35 seconds) | (0~9999) | T1 Timer (Rx) |
| 12: | 0 | | Not used |
| 13: | 1300 (13 seconds) | (0~9999) | Maximum time to receive oneline of image data |
| 14: | 0 | | Not used |
| 15: | 120 (1200 ms) | (0~999) | Hooking detection time |
| 16: | 4 (4 seconds) | (0~9) | Pseudo RBT transmission from CML on time until start |
| 17: | 100 (1000 ms) | (0~999) | Pseudo RBT signal pattern: On time |
| 18: | 0 (0 ms) | (0~999) | Pseudo RBT signal pattern: Off time (short) |
| 19: | 200 (4000 ms) | (0~999) | Pseudo RBT signal pattern: Off time (long) |
| 20: | 100 (1000 ms) | (0~999) | Pseudo ring pattern: On time setting |
| 21: | 0 (0ms) | (0~999) | Pseudo ring pattern: Off time (short) |
| 22: | 200 (4000 ms) | (0~999) | Pseudo ring pattern: Off time (long) |
| 23: | 7 | (0~9) | FAX/TEL switching function signal detection level |
| 24: | 20 | (0~20) | Pseudo-RBT signal transmission level |
| 25: | 60 (600 ms) | (0~999) | Answering machine connection function signal detection time |
| 26: | 7 | (0~9) | Answering machine connection function no sound detection level |
| 27: | 0 | | Not used |
| 28: | 0 | | Not used |
| 29: | 0 | | Not used |
| 30: | 20 | | Not used |

**Figure 3-19 Service Data (page 3)**

No. 01, 05 to 08, 12, 14, and 27 to 30 are not used. Do not change their settings

NOTE

**#3 NUMERIC PARAM. (Numeric parameter settings)**

The relationship between the settings and the detection levels is as follows:

**Parameter 23**

| | | | | |
|---|---|---|---|---|
| 0: -29 dBm | 1: -33 dBm | 2: -35 dBm | 3: -38 dBm | 4: -41 dBm |
| 5: -44 dBm | 6: -46 dBm | 7: -47 dBm | 8: -50 dBm | 9: -50 dBm |

**Parameter 24**

| | | | | |
|---|---|---|---|---|
| 0: Not used | 1: Not used | 2: Not used | 3: Not used | 4: Not used |
| 5: -8 dBm | 6: -9 dBm | 7: -10 dBm | 8: -11 dBm | 9: -12 dBm |
| 10: -13 dBm | 11: -14 dBm | 12: -15 dBm | 13: -16 dBm | 14: -17 dBm |
| 15: -18 dBm | 16: -19 dBm | 17: -20 dBm | 18: -21 dBm | 19: -22 dBm |
| 20: -23 dBm | | | | |

**Parameter 26**

| | | | | |
|---|---|---|---|---|
| 0: -30 dBm | 1:-34.5 dBm | 2:-36.5 dBm | 3: -40 dBm | 4: -42 dBm |
| 5: -46 dBm | 6: -48 dBm | 7: -50 dBm | 8: -51 dBm | 9: -54 dBm |

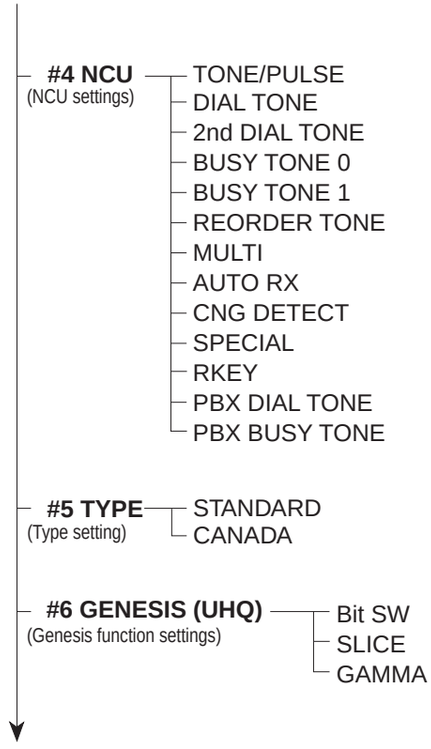



**Figure 3-20 Service Data (page 4)**

**#4 NCU (NCU settings)**

The values of these items are all set to match a specific nation's communications standards by the #5 TYPE setting. Do not change these settings.

**#6 GENESIS (UHQ function settings)**

Tampering with this setting may cause the scanned image quality to deteriorate.

Do not change these settings.

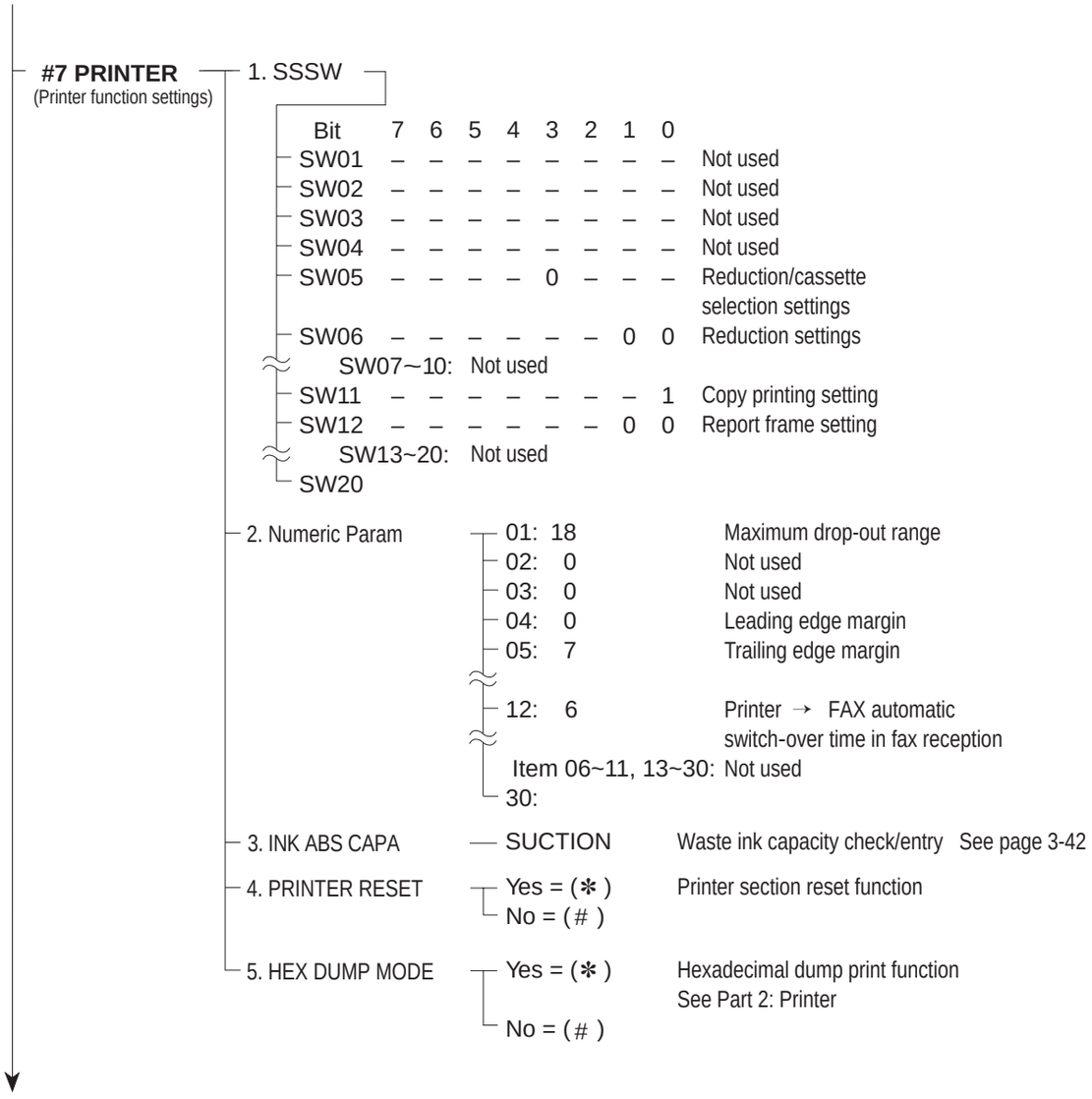

#7 PRINTER
(Printer function settings)
1. SSSW
Bit 7 6 5 4 3 2 1 0
SW01 – – – – – – – – Not used
SW02 – – – – – – – – Not used
SW03 – – – – – – – – Not used
SW04 – – – – – – – – Not used
SW05 – – – – 0 – – – Reduction/cassette selection settings
SW06 – – – – – – 0 0 Reduction settings
SW07~10: Not used
SW11 – – – – – – – 1 Copy printing setting
SW12 – – – – – – 0 0 Report frame setting
SW13~20: Not used
SW20
2. Numeric Param
01: 18 Maximum drop-out range
02: 0 Not used
03: 0 Not used
04: 0 Leading edge margin
05: 7 Trailing edge margin
12: 6 Printer → FAX automatic switch-over time in fax reception
Item 06~11, 13~30: Not used
30:
3. INK ABS CAPA
SUCTION
Waste ink capacity check/entry See page 3-42
4. PRINTER RESET
Yes = (✻)
No = (#)
Printer section reset function
5. HEX DUMP MODE
Yes = (✻)
No = (#)
Hexadecimal dump print function
See Part 2: Printer

**Figure 3-21 Service Data (page 5)**

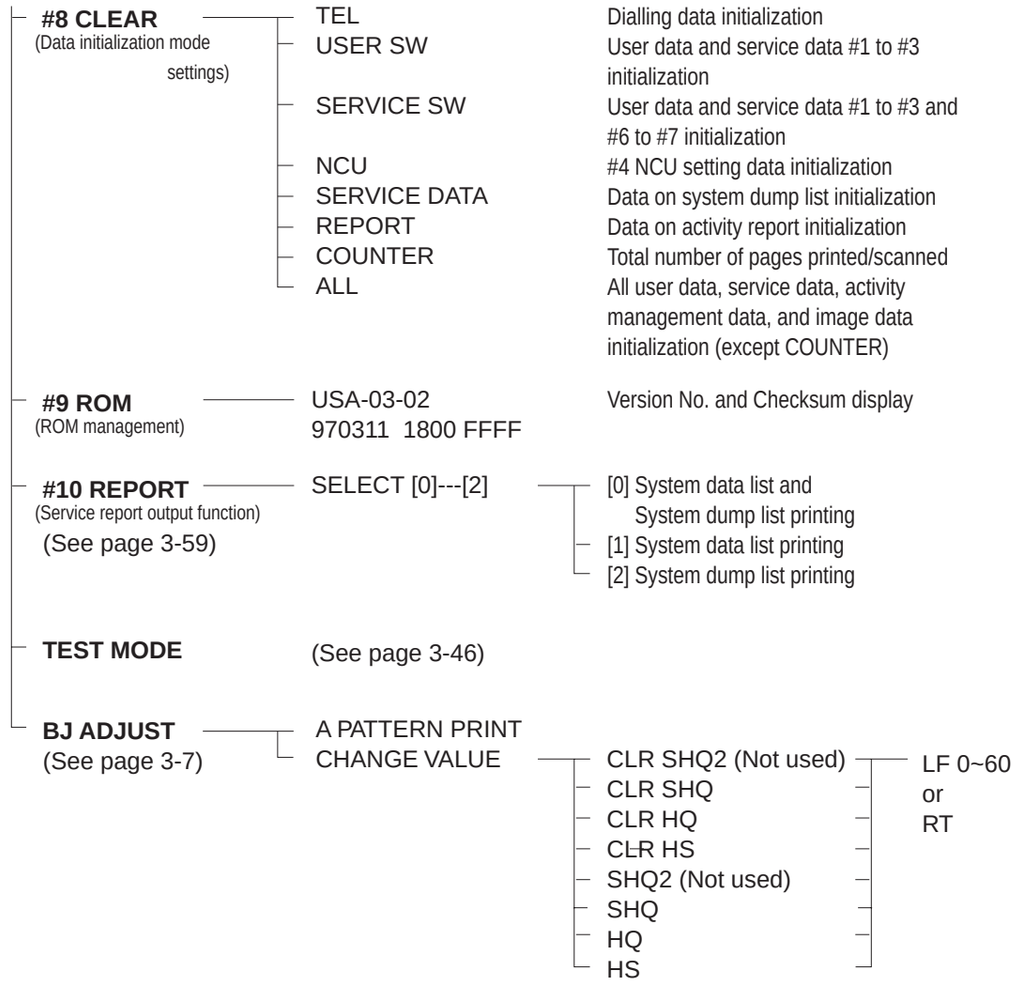



**Figure 3-22 Service Data (page 6)**

**NOTE**

If USER SW is selected from #8 CLEAR, the memory management of the user data is not cleared. If TEL or SERVICE SW is selected, the memory management of the user data is cleared.

**REFERENCE**

For details on test mode, see *6.2 Service Test Functions on page 3-44*.

## 5.2.4 Explanation of service data

### a) SSSW (Service Soft Switch settings)

The items registered and set by each of these switches comprise 8-bit switches. The figure below shows which numbers are assigned to which bits. Each bit has a value of either 0 or 1.

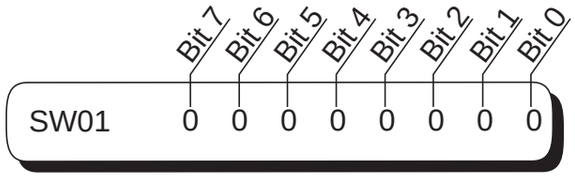
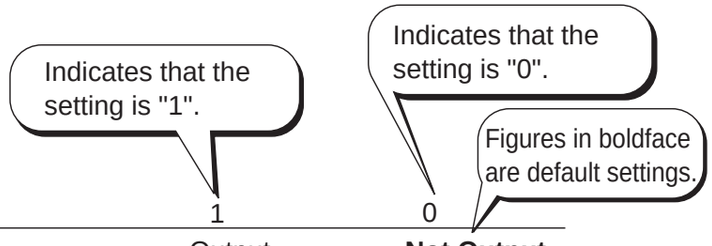



**Figure 3-23 Bit Switch Display**

See the chart in the service data shown in *this Chapter, 5.2.3 Service data setting* to see effective bits and their default values. The meanings (functions) of the bits are not described in this manual except the new switches added to this model. See *the G3 Facsimile Service Data Handbook* (supplied separately) for details of the switches.
Below are examples showing how to read bit switch tables.




| Bit | Function | 1 | 0 |
|---|---|---|---|
| 0 | Service error code | Output | **Not Output** |
| 1 | Error dump list | Output | **Not Output** |
| 2 | Not used | | |
| 3 | Copy function | No | **Yes** |
| 4 | ##300 series service error code | **Output** | Not Output |
| 5 | Not used | | |
| 6 | Date & Time setting restriction | Setting restricted | **Setting possible** |
| 7 | User setting restriction | Setting possible | **Setting restricted** |

**Figure 3-24 How to Read Bit Switch Tables**

### 5.2.5 New SSSWs/parameters added to this model

**#1 SSSW (service soft switch setting)**

**SW01 (service soft switch 01: error management)**

| Bit | Function | 1 | 0 |
|---|---|---|---|
| 0 | Service error code | Output | **Not output** |
| 1 | Error dump list | Output | **Not output** |
| 2 | Not used | | |
| 3 | Copy function | No | **Yes** |
| 4 | ##300 series service error code | Output | **Not output** |
| 5 | Not used | | |
| 6 | Date & Time setting restriction | Setting restricted | **Setting possible** |
| 7 | Not used | | |

**[Bit 4]**

Even when Bit0 is set to "Not output", you can select whether or not to output ##300 series Service Error Codes, caused by hardware malfunction.

When "Output" is selected, ##300 series Service Error Codes are displayed and in reports.

When "Not Output" is selected, no Service Error Codes are displayed.

**#3 NUMERIC PARAM (numeric parameter settings)**

| No. | Function | Selecting range | Default setting |
|---|---|---|---|
| 10 | T0 Timer | 0~9999 | 5500 (55 second) |
| 11 | T1 Timer (Rx) | 0~9999 | 3500 (35 second) |
| 13 | Maximum time to receive one line of image data | 500~3000 | 1300 (13 second) |

**[Parameter 10]**

The "wait time after transmission of a dialing signal ends until a significant signal is detected in transmission" was set as T1 timer with parameter 10.

However, ITU-T recommends that it should be set as T0 timer, so parameter 10 has been renamed to T0 timer and the default time-out time has been changed from 35 to 55 seconds.

**NOTE**

The T1 timer for the transmitter (wait time after a CED, V21 flag, or ANSam significant signal is detected until the next significant signal is detected) is fixed at 35 seconds.

**[Parameter 11]**

Set the T1 timer for the receiver (wait time after DIS transmission starts until a significant signal is received).

If frequent errors occur during reception (2 instances) because of line connection conditions, raise the value of this parameter.

**[Parameter 13]**

Set the maximum time to receive one line of image data when image data is received.

If the other party is a computer fax and the time to receive one line of image data is long, raise the value of this parameter to increase the maximum reception (2 instances) time.

**#7 PRINTER (printer function settings)**

**1. SSSW**

**SW12 (Switch 12: Report frame setting)**

| Bit | Function | 1 | 0 |
|---|---|---|---|
| 0 | Report frame lines | OFF | **ON** |
| 1 | Report frame line types | Dashed line | **Solid line** |
| 2 | Not used | | |
| 3 | Not used | | |
| 4 | Not used | | |
| 5 | Not used | | |
| 6 | Not used | | |
| 7 | Not used | | |

**[Bit 0]**

Select whether to draw a frame for printing a report or list.

**[Bit 1]**

If a frame is drawn for printing a report or list, either a solid line or a dashed line can be selected.

**2. NUMERIC PARAM.**

| No. | Function | Selecting range | Default setting |
|---|---|---|---|
| 12 | PRINTER mode → FAX mode automatic switch-over time in fax reception | 0 ~ 127 (128 ~ 9999: Not used) | 6 ( 60 seconds) |

**[Parameter 12]**

When the machine receives a fax in printer mode, it will automatically switch to fax mode after a specific period of time (as specified using the parameter setting ×10 sec.) for automatic output of the received image –as long as it is not suffering from an error or is not performing a printer operation. The machine will then switch back to printer mode after generating the received image.

Specifying "0" to the parameter will disable the automatic switch-over (it does not mean 0 sec.)

**3. INK ABSORBER CAPA**

This switch allows the waste ink capacity stored in the SCNT board to be checked or entered.

**[SUCTION]**

This allows the waste ink capacity for the ink absorbed during cleaning to be checked or entered.

When entering the waste ink capacity, use the numeric buttons to enter a value 0 to 100 (%).

**NOTE**

The ink absorber's absorption capacity for the waste ink discharged by the BJ cartridge is set to a certain amount. The waste ink capacity settings are stored in the PCNT board's EEPROM. When replacing the PCNT board, check the waste ink capacity and enter the waste ink capacity into the new PCNT board.

The various waste ink capacity can be checked with the SYSTEM DUMP LIST.

# 6. TEST FUNCTIONS

## 6.1 User Test Print Functions

User enabled Test print functions are as follow.

### 6.1.1 Nozzle check

Execute cleaning if this test printing shows each nozzle condition such as no ejection, unclear or unstable etc. If the printing does not improve even after the cartridge is cleaned five times, replace the BJ cartridge or the ink cartridge. Press the *FUNCTION* button then select *"NOZZLE CHECK".*

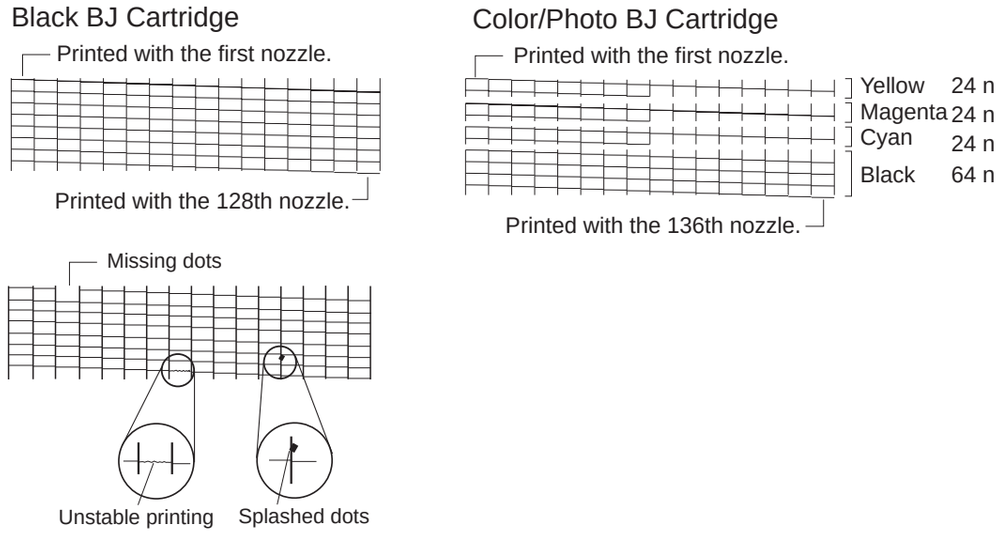



**Figure 3-25 Nozzle Check Pattern**

## 6.2 Service Test Functions

The fax functions for testing individual operations, such as below.
See *Page 3-39* for details of entering the test mode. To leave the test mode, press the *FUNCTION* button, and then > button.

### 6.2.1 Test mode overview

Test mode can be executed by following the menu items from the display.

**a) DRAM tests**

Writes data to DRAM image storage areas and reads that data to check operations.

**b) CS test**

CS test is used to enter the contact sensor's shading data.

**c) Print test**

Prints nine different patterns within the print area.

**d) Modem, NCU tests**

The frequency test and the G3 signal transmission and CNG signal and DTMF signals reception tests.

**e) Faculty tests**

Test the operation of operation panel and sensor functions.

### 6.2.2 Test mode flowchart

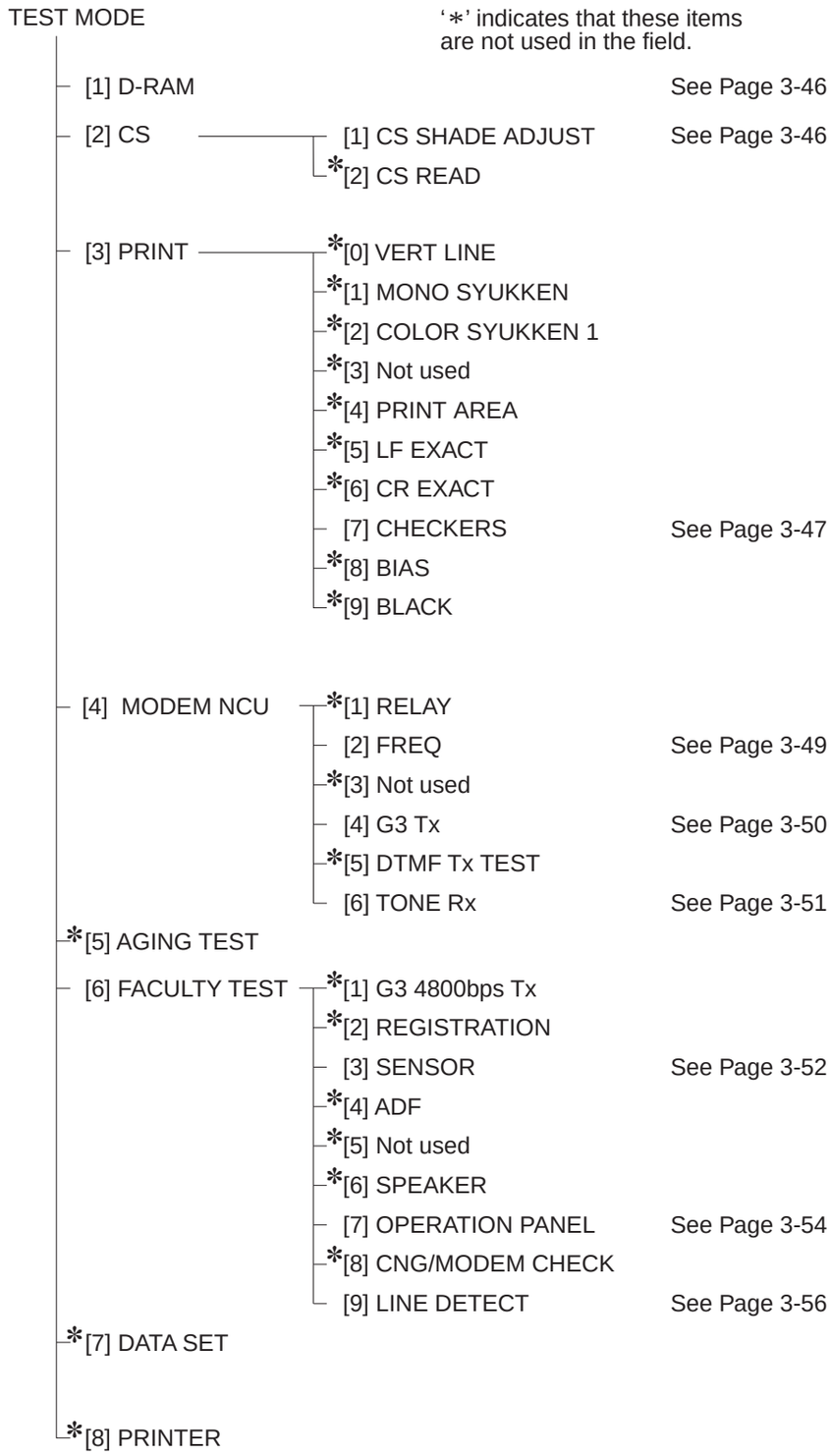



**Figure 3-26 Test Mode**

### 6.2.3 D-RAM tests

Pressing the *1* button from the test mode menu selects the D-RAM tests. D-RAM Test 1 writes data to the entire D-RAM region and reads it out to check that operations are correct. D-RAM Test 2 just reads data at high speed.

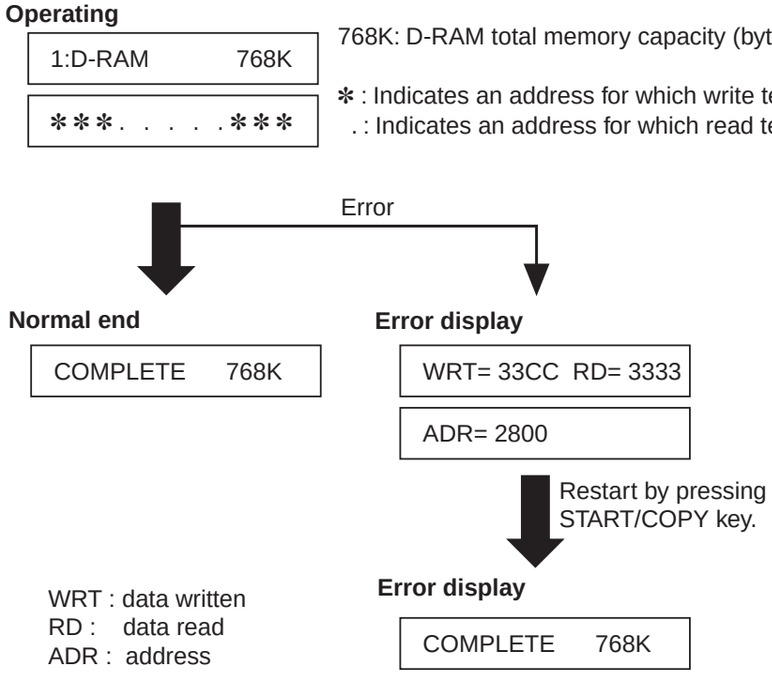



**Figure 3-27 D-RAM Test**

### 6.2.4 CS tests

Pressing the *1* button from the test mode menu selects the CS tests. CS SHADE ADJUST is used to enter the contact sensor's shading data.

**REFERENCE**

Performs the same operation as #3 CALIBRATION in SPECIAL MODE.
Details on CS SHADE ADJUST, see *3.1 Shading Data Adjustment on page 3-6*.
Tests [2] is not used in the field.

### 6.2.5 PRINT test

Pressing the *3* button from the test mode menu selects the print test. This test prints various patterns. For servicing, use the 3-7: CHECKERS pattern (press the *7* button from the print test menu). The other patterns are not to be used since they are for development and factory personnel. End this test by pressing the STOP button.
Check the pattern for the following:

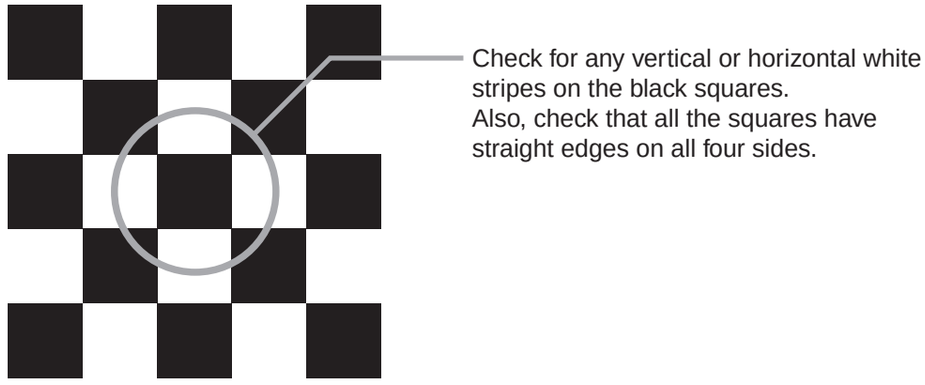

Check for any vertical or horizontal white stripes on the black squares.
Also, check that all the squares have straight edges on all four sides.

**Figure 3-28 Print Test Pattern Check**

**NOTE**

If the print test is normal, make a copy of a document. If the copy is faulty, the reading section is faulty.

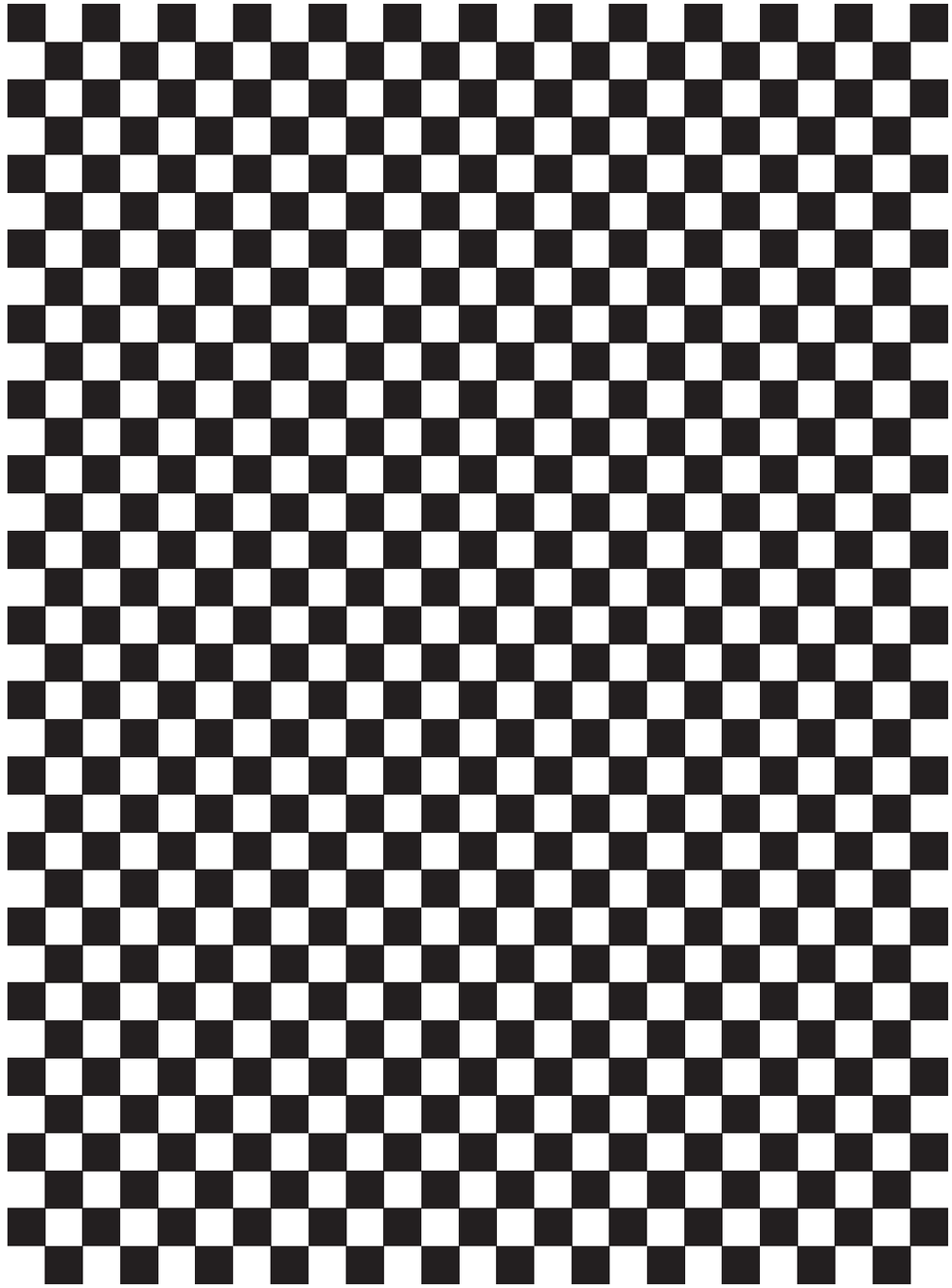


**Figure 3-29 Print Pattern Sample**

### 6.2.6 Modem and NCU tests

These tests test modem and NCU transmission and reception. The modem tests check whether signals are sent correctly from the modem by comparing the sound of the signals from the speaker with the sounds from a normal modem. Also, you check on the display whether or not the modem correctly detected received tone signals and DTMF signals.
End this test by pressing the *STOP* button.

| Modem test type | Overview |
|---|---|
| Frequency test | The modem sends tone signals from the modular jack and the speaker. |
| G3 signal transmission test | The modem sends G3 signals from the modular jack and the speaker. |
| CNG signal reception tests | The modem detects specific frequencies and DTMF signals received from the modular jack. |

#### a) Frequency test

The frequency test menu is selected by pressing the *2* button from the MODEM NCU test menu. Signals of the frequencies below are sent from the modem using the modular jack and the speaker. The frequency can be changed with the numeric buttons.

| Numeric button | Frequency |
|---|---|
| 0 | Pseudo-RBT |
| 1 | 462 Hz |
| 2 | 1100 Hz |
| 3 | 1300 Hz |
| 4 | 1500 Hz |
| 5 | 1650 Hz |
| 6 | 1850 Hz |
| 7 | 2100 Hz |

**NOTE**

The pseudo-ringback tone transmission pattern and frequency and the output levels for each frequency follow the service data transmission level settings.

**b) G3 signal transmission test**

The G3 signal transmission test menu is selected by pressing the *4* button from the MODEM NCU test menu. The G3 signals below are sent from the modem using the modular jack and the speaker. The frequency can be changed with the numeric buttons.

| Numeric button | Frequency |
|---|---|
| 0 | 300 bps |
| 1 | 2400 bps |
| 2 | 4800 bps |
| 3 | 7200 bps |
| 4 | 9600 bps |
| 5 | TC7200 bps |
| 6 | TC9600 bps |
| 7 | 12000 bps |
| 8 | 14400 bps |

**NOTE**

The transmission level can be changed with the *FUNCTION* button then < and > button.

**c) CNG and DTMF signal reception tests**

The CNG and DTMF signal reception test is selected by pressing the *6* button from the MODEM NCU test menu. In these tests, you can check whether the CNG signals and DTMF signals received from the modular jack are detected by the modem.

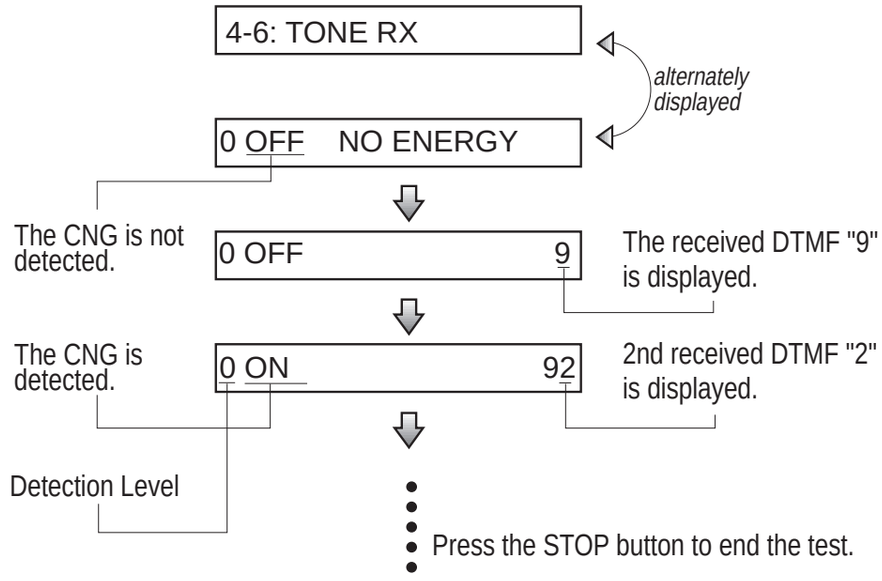

4-6: TONE RX
alternately displayed
0 OFF NO ENERGY
The CNG is not detected.
0 OFF 9
The received DTMF "9" is displayed.
The CNG is detected.
0 ON 92
2nd received DTMF "2" is displayed.
Detection Level
Press the STOP button to end the test.

**Figure 3-30 CNG and DTMF Signal Reception Tests**

### 6.2.7 Faculty tests

The faculty tests are selected by pressing the *6* button from the test mode menu. These tests test the following faculties of this fax.

| Test type | Overview |
|---|---|
| Sensor tests | Test whether the sensors are operating correctly. |
| Operation panel test | Tests whether the button switches on the control panel are operating correctly. |
| Line signal reception test | Tests whether the NCU board signal sensor and frequency counter are operating correctly. |

#### a) Sensor tests

The sensor test is selected by pressing the *3* button from the faculty test menu. In this test, you can check the status of each sensor of this fax in item 1 on the display.
You can also check if sensors that use actuators and microswitches are operating correctly by moving the actuator or microswitch.

NOTE

The sensor tests cannot be used to test all of the sensors. The following sensors cannot be tested with the sensor tests:

**Home position sensor, paper edge sensor, and ink detection sensor.**

If any of these sensor are faulty, an error message or service error code will appear to indicate the faulty sensor.

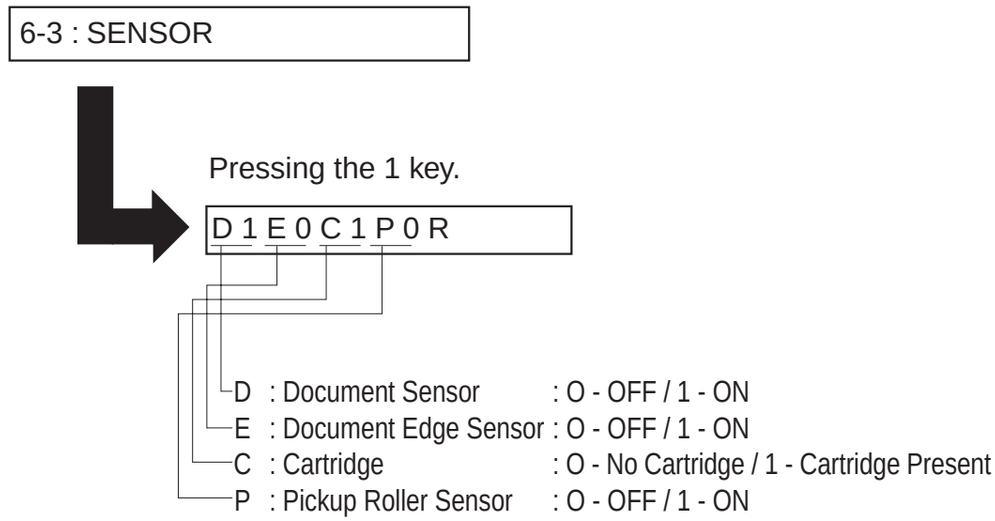

6-3 : SENSOR
Pressing the 1 key.
D 1 E 0 C 1 P 0 R
D : Document Sensor : O - OFF / 1 - ON
E : Document Edge Sensor : O - OFF / 1 - ON
C : Cartridge : O - No Cartridge / 1 - Cartridge Present
P : Pickup Roller Sensor : O - OFF / 1 - ON

**Figure 3-31 Sensor Tests**

**b) Operation panel tests**

The operation panel test is selected by pressing the *7* button from the faculty test menu. In this test, check that the display, LED lamps, and buttons on the control panel are operating correctly.

**b-1) Display test**

Pressing the *START/COPY* button from the control panel menu, "H" is displayed 16 characters by 1 line on the display. The next time the *START/COPY* button is pressed, all the LCD dots on the display are displayed. Check for any LCD dots in the display that are not displayed.

**b-2) LED lamp test**

The LED lamp test is selected by pressing the *START/COPY* button after the display test.

When the *START/COPY* button is pressed, all the lamps on the control panel light. Check for any LED that does not light during the test.

**b-3) Operation button test**

The Operation button test is selected by pressing the *START/COPY* button after the LED lamp test.

In this test, you press the button corresponding to the displayed character to put it out. The table giving the correspondence between the characters and the buttons is below.

| Character | Operation button | Character | Operation button |
|---|---|---|---|
| 1-# | Numeric buttons | $ | Resolution button |
| | | & | Receive mode button |
| R | Redial button | F | Function button |
| D | Coded dial button | C | Cartridge button |
| | | M | Resume button |

When all the characters displayed have gone out, the system next starts the one-touch speed dialing button test. The letters a-f are displayed on the display, corresponding to one-touch speed dialing buttons 01-06. Each letter displayed on the display goes out when its corresponding one-touch speed dialing button is pressed.

In this test, check for operation buttons whose corresponding character or letter does not go out when the button is pressed.

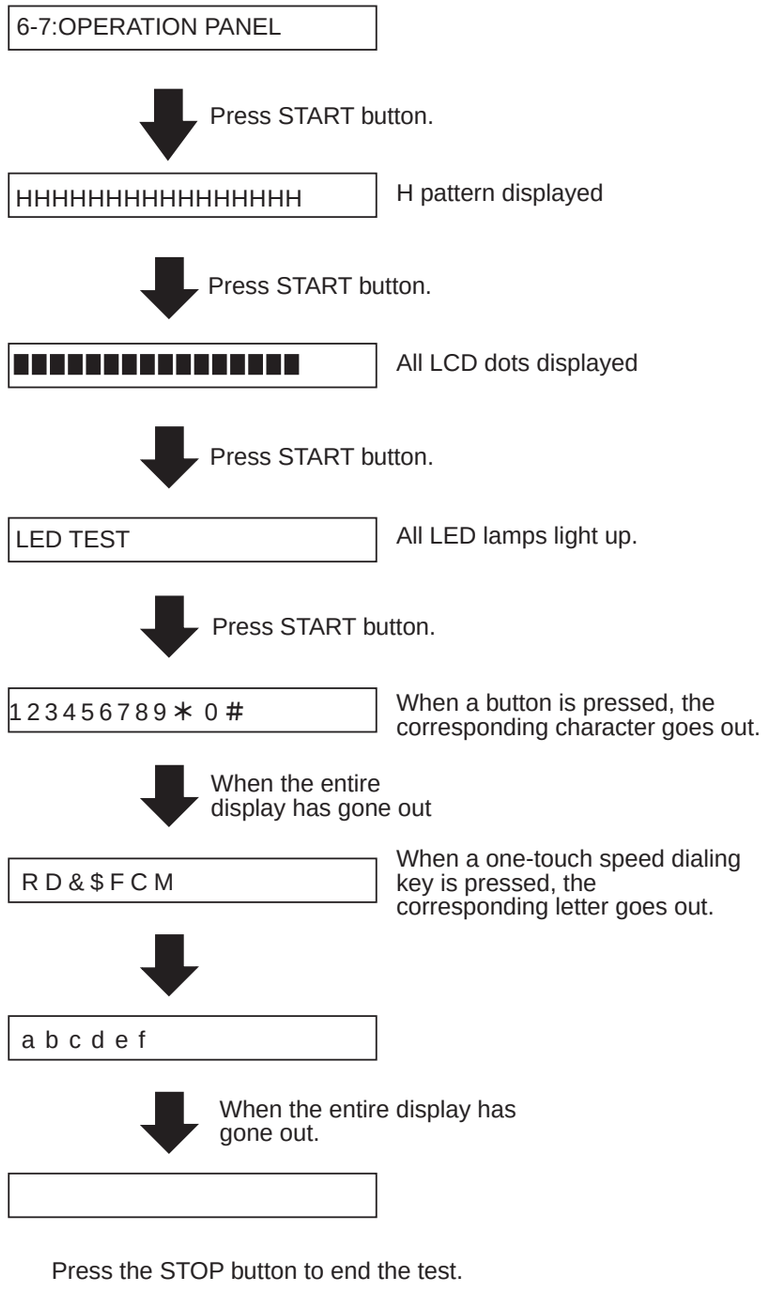

6-7:OPERATION PANEL
Press START button.
HHHHHHHHHHHHHHHH
H pattern displayed
Press START button.
All LCD dots displayed
Press START button.
LED TEST
All LED lamps light up.
Press START button.
1 2 3 4 5 6 7 8 9 ∗ 0 #
When a button is pressed, the corresponding character goes out.
When the entire display has gone out
R D & $ F C M
When a one-touch speed dialing key is pressed, the corresponding letter goes out.
a b c d e f
When the entire display has gone out.
Press the STOP button to end the test.

**Figure 3-32 Operation Panel**

### c) Line signal reception test

The line detect test menu is selected by pressing the *9* button from the faculty test menu. This test checks the operation of the NCU signal sensor and frequency counter. In Menu 1, the CI, status can be detected and in Menu 2 the frequency can be detected at changing detection levels. In this way, you can check if the NCU board is correctly detecting signals.

#### c-1) Test Menu 1

Test Menu 1 is selected by pressing the *1* button from the Line Detect menu. When CI, is detected from the modular jack, the display changes from OFF to ON and the received frequency is displayed.

#### c-2) Test Menu 2

Test Menu 2 is selected by pressing the *2* button from the Line Detect menu. When a tonal frequency is detected from the modular jack, the display changes from OFF to ON and the received frequency is displayed. The frequency detection level can be set with the numeric buttons.

| Numeric button | Detection level (dBm) |
|---|---|
| 0 | –26 |
| 1 | –30 |
| 2 | –32 |
| 3 | –35 |
| 4 | –38 |
| 5 | –41 |
| 6 | –43 |
| 7 | –45 |
| 8 | –47 |
| 9 | –51 |

#### c-3) Test Menu 3

Test Menu 3 is selected by pressing the *3* button from the Line Detect menu. When CNG is detected from the modular jack, the display changes from OFF to ON.

#### c-4) Test Menu 4

This item is not used. Do not select it.

# 7. SERVICE REPORT

## 7.1 Report Output Function

### 7.1.1 User report output functions

The fax can output user reports manually by *SPECIAL MODE*, or automatically, according to user data settings.

**a) Manual output of reports by SPECIAL MODE (#5 PRINT REPORT)**

| Report type | Operations |
|---|---|
| SPEED DIAL LIST | |
| One-touch dial list | Press *FUNCTION, O*, |
| Coded speed dial list | then select menu (#5 PRINT REPORT) by < and > |
| Group dial list | button and Press *START/COPY* button. |
| User's data list | (Select report type by < and > and Press *START/COPY* button. |
| Error report (system dump list) | |
| Activity Management Reports | |

**b) Reports output automatically by user data settings**

Each report written below can be automatically output by specifying "REPORT SETTINGS" in user data.

Transmission report
Reception report
Activity Management Reports

NOTE

**ROM Version display**

The ROM version is printed on the top left hand side of the User's data list. Please refer to this when troubleshooting.

example:

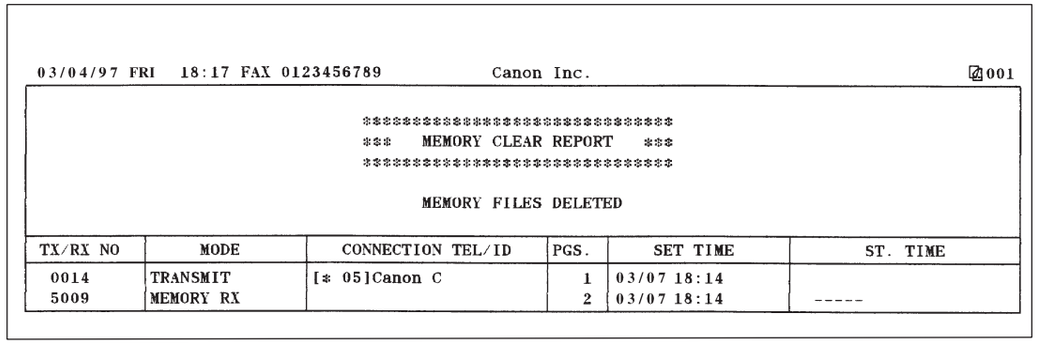
USA XX-XX / X.XX

Printer ROM version
MAIN ROM version

### c) Reports output automatically

#### Memory clear list

The fax automatically outputs a memory clear list when the power is turned on after a power cut.



03/04/97 FRI 18:17 FAX 0123456789 Canon Inc. 001

**********************************
*** MEMORY CLEAR REPORT ***
**********************************

MEMORY FILES DELETED

| TX/RX NO | MODE | CONNECTION TEL/ID | PGS. | SET TIME | ST. TIME |
|---|---|---|---|---|---|
| 0014 | TRANSMIT | [* 05]Canon C | 1 | 03/07 18:14 | |
| 5009 | MEMORY RX | | 2 | 03/07 18:14 | ----- |

**Figure 3-33 Memory Clear List**

| | |
|---|---|
| TX/RX NO | : Indicates four digits of the transaction number |
| MODE | : Indicates, TRANSMISSION, or MEMORY RX |
| CONNECTION TEL | : Number sent from the other party or number dialled |
| PAGES | : Number of pages are stored in memory |
| SET TIME | : Time when data is stored in memory |
| START TIME | : Planned transmission start time (24-hour display) |

### 7.1.2 Service report output functions

The fax outputs service data setting status, past communications history reports.

#### a) List of service reports

The fax outputs the service reports shown below.

| Report type | Operations |
|---|---|
| 1. System data list<br>2. System dump list | In the service mode, select the **#10 REPORT** and the desired numeric button 0 to 2.<br>Pressing buttons 1 to 2 outputs the respective service reports on the left.<br>When pressing button 0, both are output. |
| Service activity report (with service error code and dump list) | If you set bits 0 and 1 of #1 SSSW SW01 in the service mode, the service error code and dump list are indicated on the activity report (sending/receiving). |

### a-1) System data list

This list shows service data #1~#5, #7, #9 setting statuses.

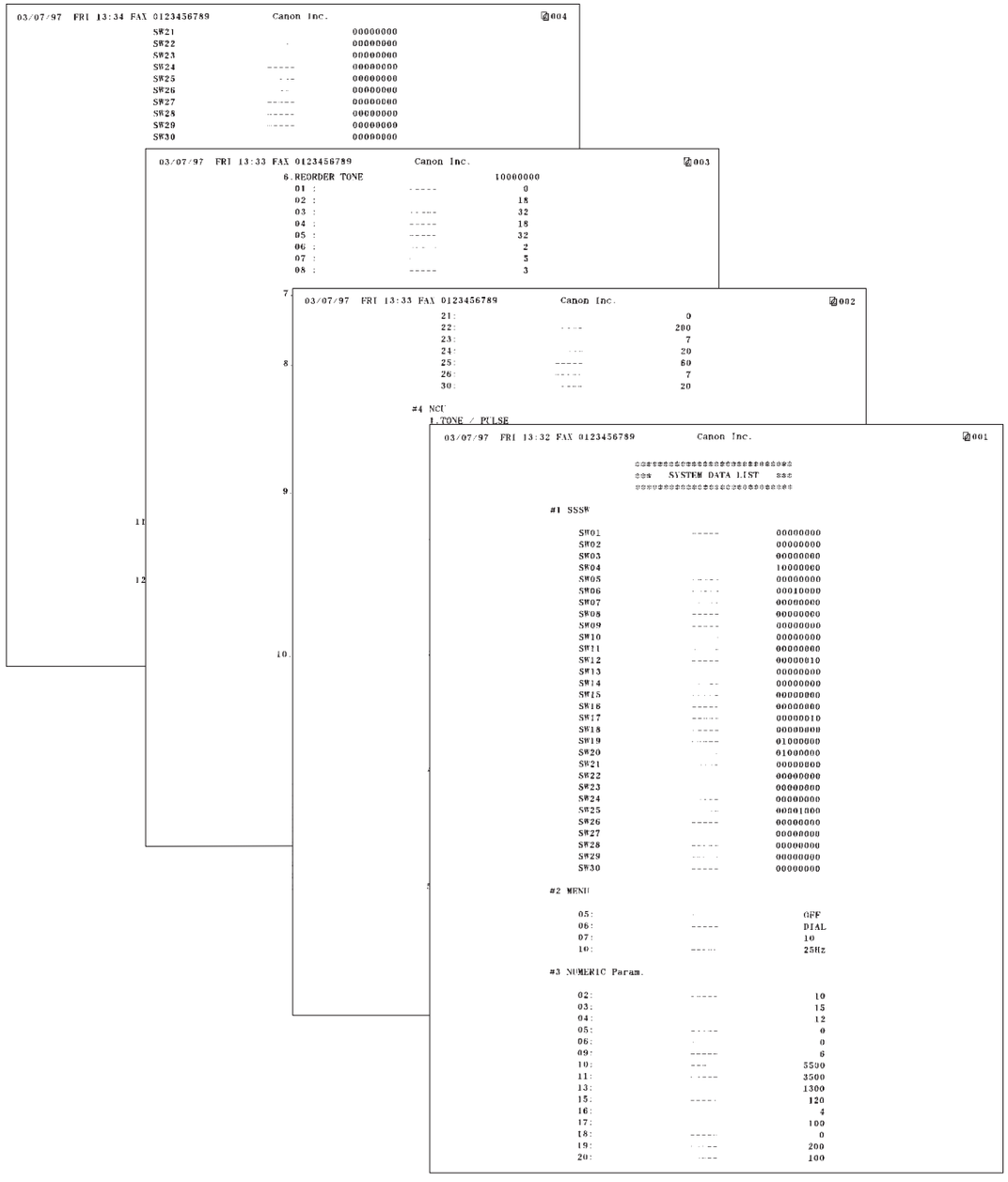
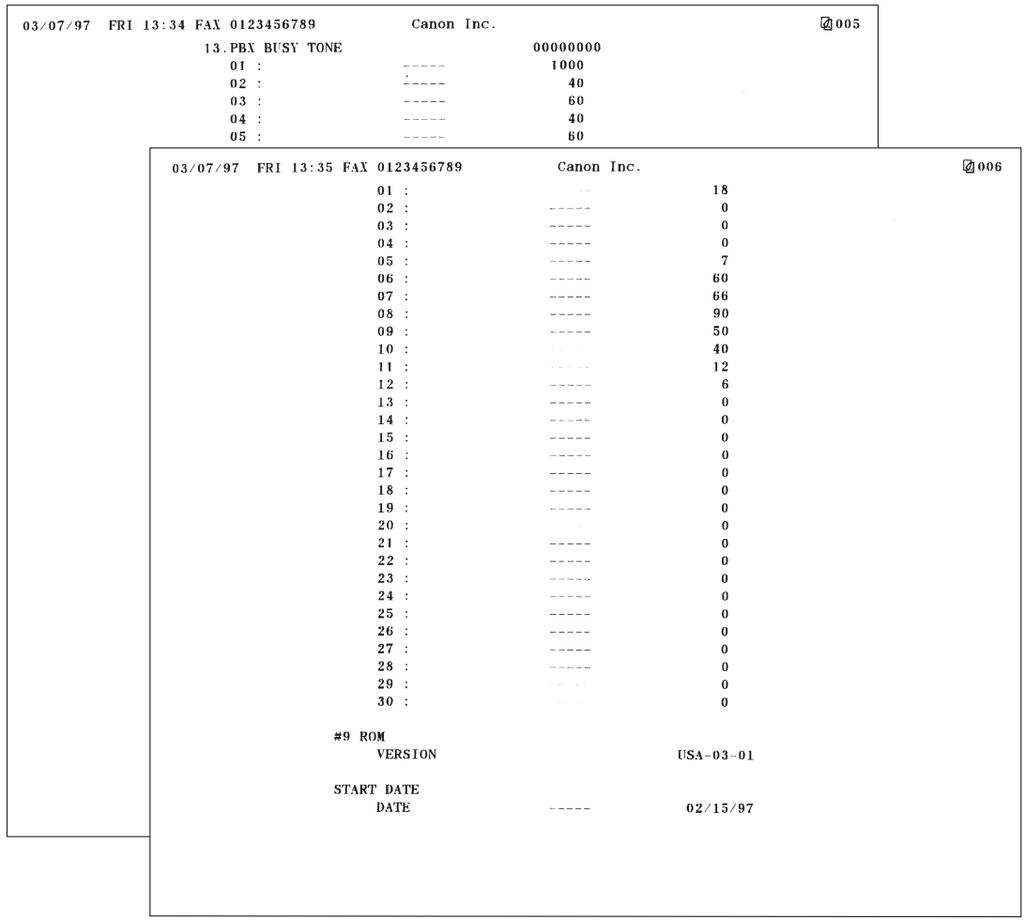



**Figure 3-34 System Data List (page 1 ~ page 4)**



03/07/97 FRI 13:34 FAX 0123456789 Canon Inc. 005

| | | |
|---|---|---|
| 13.PBX BUSY TONE | | 00000000 |
| 01 : | ----- | 1000 |
| 02 : | ----- | 40 |
| 03 : | ----- | 60 |
| 04 : | ----- | 40 |
| 05 : | ----- | 60 |

03/07/97 FRI 13:35 FAX 0123456789 Canon Inc. 006

| | | |
|---|---|---|
| 01 : | | 18 |
| 02 : | ----- | 0 |
| 03 : | ----- | 0 |
| 04 : | ----- | 0 |
| 05 : | ----- | 7 |
| 06 : | ----- | 60 |
| 07 : | ----- | 66 |
| 08 : | ----- | 90 |
| 09 : | ----- | 50 |
| 10 : | | 40 |
| 11 : | | 12 |
| 12 : | ----- | 6 |
| 13 : | ----- | 0 |
| 14 : | ----- | 0 |
| 15 : | ----- | 0 |
| 16 : | ----- | 0 |
| 17 : | ----- | 0 |
| 18 : | ----- | 0 |
| 19 : | ----- | 0 |
| 20 : | | 0 |
| 21 : | ----- | 0 |
| 22 : | ----- | 0 |
| 23 : | ----- | 0 |
| 24 : | ----- | 0 |
| 25 : | ----- | 0 |
| 26 : | ----- | 0 |
| 27 : | ----- | 0 |
| 28 : | ----- | 0 |
| 29 : | | 0 |
| 30 : | | 0 |

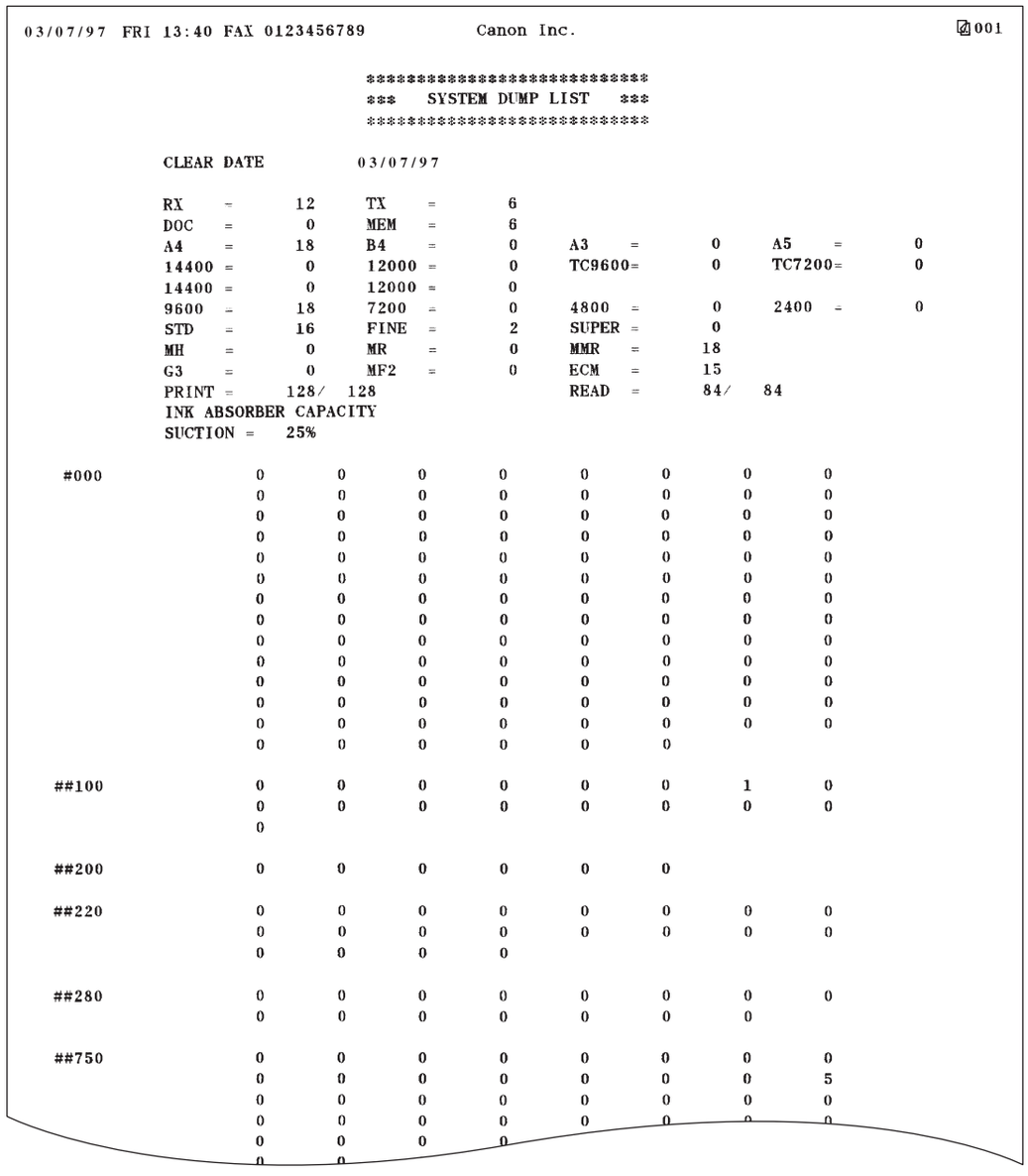
| | | |
|---|---|---|
| #9 ROM | | |
| VERSION | | USA-03-01 |
| START DATE | | |
| DATE | ----- | 02/15/97 |

**Figure 3-35 System Data List (page 5 ~ page 6)**

NOTE

"START DATE" records the date when the fax performs its first operation, after shipment from the factory.

### a-2) System dump list



03/07/97 FRI 13:40 FAX 0123456789 Canon Inc. 001

******************************
*** SYSTEM DUMP LIST ***
******************************

CLEAR DATE 03/07/97

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| RX = | 12 | TX = | 6 | | | | |
| DOC = | 0 | MEM = | 6 | | | | |
| A4 = | 18 | B4 = | 0 | A3 = | 0 | A5 = | 0 |
| 14400 = | 0 | 12000 = | 0 | TC9600= | 0 | TC7200= | 0 |
| 14400 = | 0 | 12000 = | 0 | | | | |
| 9600 = | 18 | 7200 = | 0 | 4800 = | 0 | 2400 = | 0 |
| STD = | 16 | FINE = | 2 | SUPER = | 0 | | |
| MH = | 0 | MR = | 0 | MMR = | 18 | | |
| G3 = | 0 | MF2 = | 0 | ECM = | 15 | | |
| PRINT = | 128/ 128 | | | READ = | 84/ 84 | | |

INK ABSORBER CAPACITY
SUCTION = 25%

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| #000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | | |
| ##100 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | | | | | | | |
| ##200 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| ##220 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | | | | |
| ##280 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| ##750 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | | | | |
| | 0 | 0 | | | | | | |

**Figure 3-36 System Dump List (1/2)**

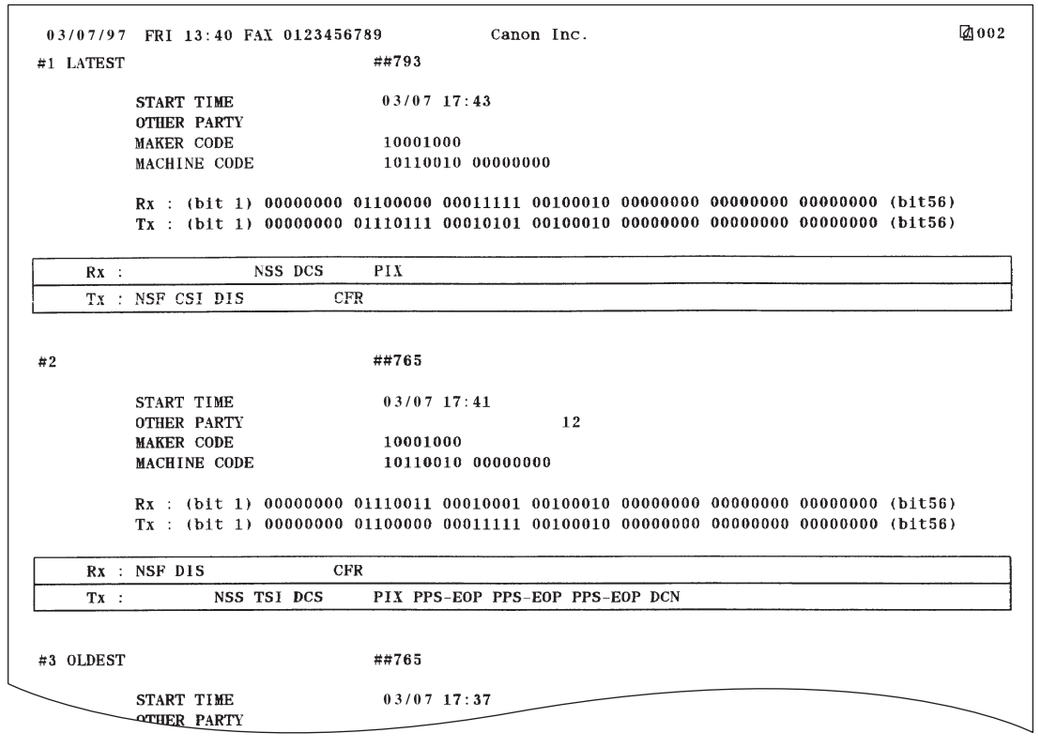
CLEAR DATE : Date on which data was initialized with service data #8 CLEAR, ALL
RX/TX : Total number of pages received/transmissions
DOC/MEM : Total number of pages directly/memory transmitted
A4/B4/A3/A5 : Total number of pages transmitted and received for each document size
14400 bps~2400 bps : Total number of pages transmitted and received for each modem speed
STD/FINE : Total number of pages transmitted and received for each mode
MH/MR/MMR : Total number of pages transmitted and received for each coding method
G3/MF2/ECM : Total number of pages transmitted and received in each mode
PRINT/READ : Total number of pages printed/scanned

[Display example]
PRINT = 30*/100** READ = 30*/100**
* Indicates the value input with Service Data #8 CLEAR, COUNTER.
** Indicates the value counted since shipment from the factory.

INK ABSORBER CAPACITY: Waste ink absorber's ink absorption amount
[Display example]
Suction = 10%
These indicate the following:
The suction waste ink absorber's ink absorption amount is 10%.

#000~##750
[Display example] : Total number of occurrences for each error code

| | | | | | |
|---|---|---|---|---|---|
| ##280 | 1 | 7 | 3 | 0 | 0 |
| | ##280 errors | ##281 errors | ##282 errors | | |



```
 03/07/97  FRI 13:40 FAX 0123456789          Canon Inc.                    002
#1 LATEST                          ##793

          START TIME                03/07 17:43
          OTHER PARTY
          MAKER CODE                10001000
          MACHINE CODE              10110010 00000000

          Rx : (bit 1) 00000000 01100000 00011111 00100010 00000000 00000000 00000000 (bit56)
          Tx : (bit 1) 00000000 01110111 00010101 00100010 00000000 00000000 00000000 (bit56)

     Rx :              NSS DCS     PIX
     Tx : NSF CSI DIS          CFR

#2                                 ##765

          START TIME                03/07 17:41
          OTHER PARTY                                12
          MAKER CODE                10001000
          MACHINE CODE              10110010 00000000

          Rx : (bit 1) 00000000 01110011 00010001 00100010 00000000 00000000 00000000 (bit56)
          Tx : (bit 1) 00000000 01100000 00011111 00100010 00000000 00000000 00000000 (bit56)

     Rx : NSF DIS              CFR
     Tx :          NSS TSI DCS     PIX PPS-EOP PPS-EOP PPS-EOP DCN

#3 OLDEST                          ##765

          START TIME                03/07 17:37
          OTHER PARTY
```

**Figure 3-37 System Dump List (2/2)**

| | |
|---|---|
| ##nnn | : Service error code |
| START TIME | : Communication start date and time (on 24 hour clock) |
| OTHER PARTY | : Telephone number sent from other party |
| MAKER CODE | : Maker code (For details, see *Chapter 4: 4. MAKER CODE on page 4-10*) |

[1000 1000] Indicates a Canon fax
- 1000 (lower nibble)
- 1000 (upper nibble)

| | |
|---|---|
| MACHINE CODE | : For future use |
| RX/TX | : Received/transmitted protocol signal<br>bit 1 to bit 56 of received/transmitted DIS, DCS, or DTS |

NOTE

If no service errors have occurred in the past, the above report will not be output.

### a-3) Service activity report (sending/receiving)

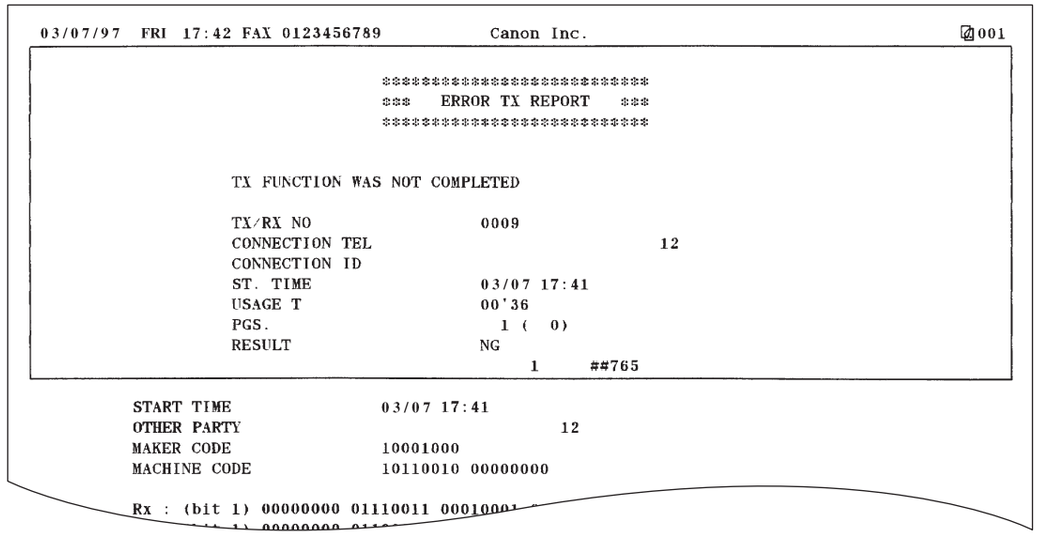



**Figure 3-38 Service Error Tx Report**

| | | |
|---|---|---|
| TX/RX NO | : | Indicates four digits of the transaction number |
| CONNECTION TEL (OTHER PARTY) | : | Number sent from the other party or number dialled (lower 20 digits) |
| CONNECTION ID | : | ID sent from the other party, if the other party is a Canon fax |
| START TIME | : | Communication start date and time (on 24-hour display) |
| USAGE TIME | : | Communication time (in minutes and seconds) |
| PAGES | : | Number of pages for which transmission was complete (For details, see *User's guide*) |
| RESULT | : | **"NG"** display with number of pages for which transmission was fault, and service error code |
| MAKER CODE | : | Maker code (For details, see *Chapter 4: 4. MAKER CODE on page 4-10)*<br>[1000 1000] Indicates a Canon fax<br>lower nibble<br>upper nibble |
| MACHINE CODE | : | For future use |
| RX/TX | : | Received/transmitted protocol signal<br>bit 1 to bit 56 of received/transmitted DIS, DCS, or DTS |

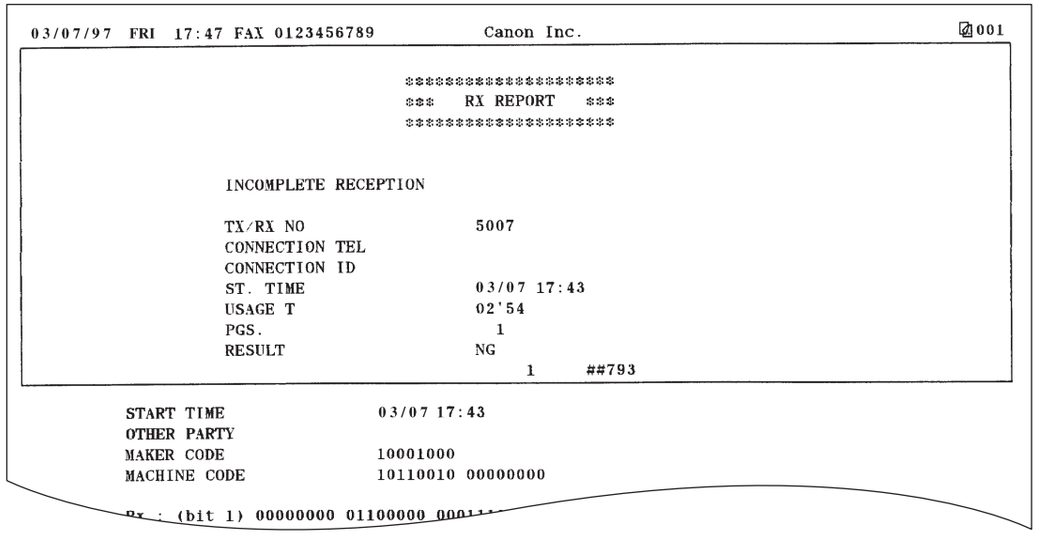



**Figure 3-39 Service Error Activity Report (receiving)**

| | | |
|---|---|---|
| TX/RX NO | : | Indicates four digits of the transaction number |
| CONNECTION TEL (OTHER PARTY) | : | Number sent from the other party or number dialled (lower 20 digits) |
| CONNECTION ID | : | ID sent from the other party, if the other party is a Canon fax |
| START TIME | : | Communication start time (on 24-hour display) |
| USAGE TIME | : | Communication time (in minutes and seconds) |
| PAGES | : | Number of pages for which receiving was complete (For details, see *User's guide*) |
| RESULT | : | **"NG"** display with number of pages for which receiving was fault, and service error code |
| MAKER CODE | : | Maker code (For details, see *Chapter 4: 4. MAKER CODE on page 4-10*) |
| MACHINE CODE | : | For future use |
| RX/TX | : | Received/transmitted protocol signal bit 1 to bit 56 of received/transmitted DIS, DCS, or DTS |

[1000 1000] Indicates a Canon fax
lower nibble
upper nibble

# 8. WIRING DIAGRAM

Refer to *"CIRCUIT DIAGRAM"* (supplied separately) for details of the connector signals.
*8.2 Connector Name and Signal Descriptions* on following page, contains a brief description of the input/output signals.
Refer to this description when carrying out troubleshooting.

## 8.1 Wiring Diagram

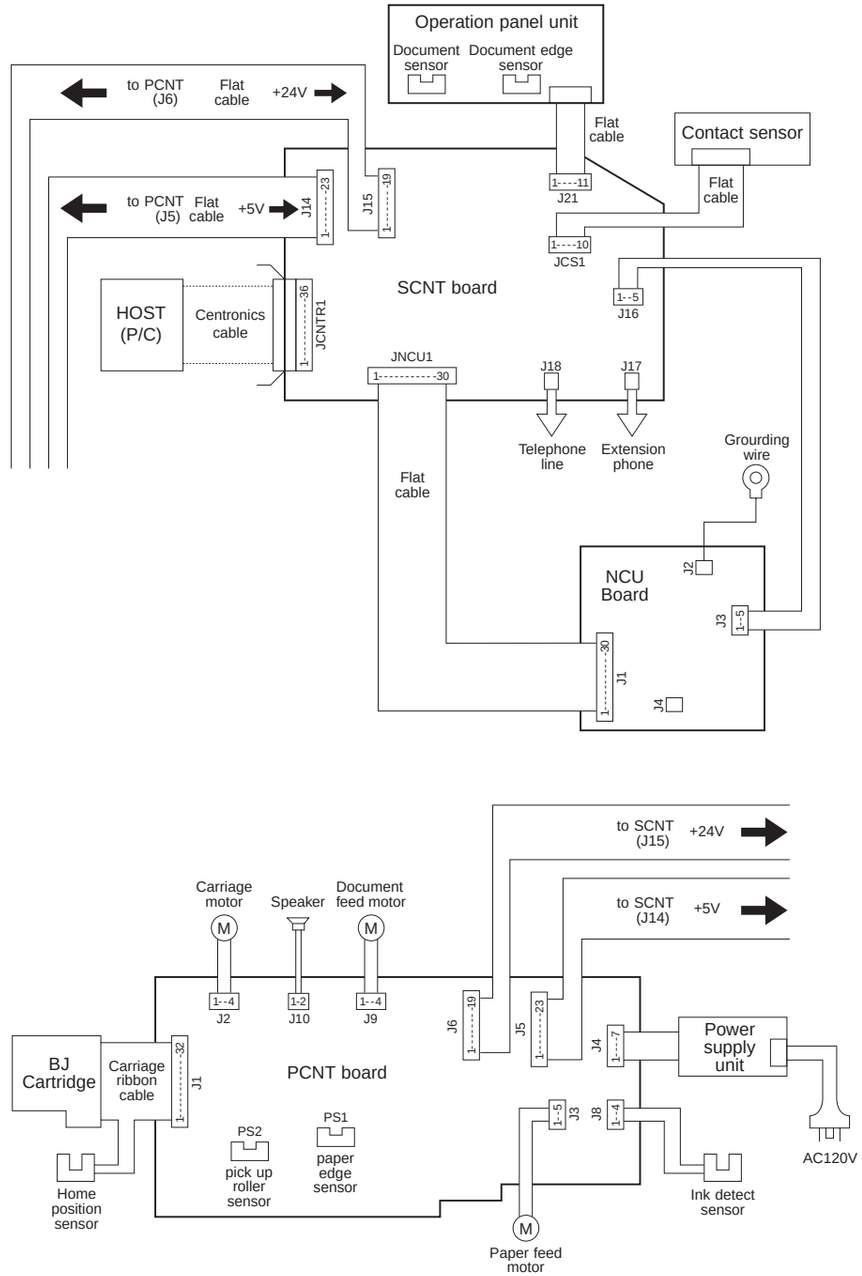



**Figure 3-40 Wiring Diagram**

## 8.2 Connector Name and Signal Descriptions

### SCNT board

| Connector name | Connected to | Description |
|---|---|---|
| J21 | Operation panel unit | Connects to Operation panel unit. Performs keyinput data exchange and LCD data exchange. This also includes document sensor and document edge sensor signals. |
| JCNTR1 | Host (PC) | Centronics connector for parallel connection to host. |
| JCS1 | Contact sensor | Connects between scanning section and contact sensor. Its purpose is to drive voltage for the contact sensor, and to receive image signals. |
| JNCU1 | NCU board (J1) | Conducts data exchange of data signals with NCU board, after modulation by the MODEM IC, and before demodulation. Also transmits control signals for the relays. |
| J14 | PCNT board (J5) | See PCNT board (J5). |
| J15 | PCNT board (J6) | See PCNT board (J6). |
| J16 | NCU board (J3) | See NCU board (J3). |
| J17 | Extension telephone | Connects to Extension telephone. |
| J18 | Telephone line | Connects to Telephone line. |

### NCU board

| Connector name | Connected to | Description |
|---|---|---|
| J1 | SCNT board (JNCU1) | See SCNT board (JNCU1) |
| J2 | Shield plate | Earthing connector |
| J3 | SCNT board (J16) | Performs data exchanges between SCNT board of suitable signal levels for the telephone line. |
| J4 | N.C. | Reserved |

### PCNT board

| Connector name | Connected to | Description |
|---|---|---|
| J1 | BJ cartridge and Home position sensor | Connector for BJ cartridge and Home position sensor. In addition to exchange of print data and BJ head temperature detection signals, also includes BJ cartridge detection and type identification signals. |
| J2 | Carriage motor | Supplies drive voltage for the carriage motor. |
| J3 | Line feed motor | Supplies drive voltage for the line feed motor. |
| J4 | Power supply unit | Input connector for DC voltage converted by the PSU. +5V and +24V voltages are supplied. |
| J5 | SCNT board (J14) | Supplies +5V voltage for the SCNT board and Centronics interface signal. |
| J6 | SCNT board (J15) | Supplies +24V voltage for the SCNT board and receives control signals for the document feed motor and printer control signal. |
| J8 | Ink detection sensor | Receives detection signals from the ink detection sensor. |
| J9 | Document feed motor | Provides drive voltage for the document feed motor. |
| J10 | Speaker | Connects to speaker. |

# 1. INSTALLATION

This machine has been designed for user installation. Therefore, this manual contains only an outline description of the procedures. For details of the installation, see the *USER'S GUIDE*.

## 1.1 Setting up

- Choosing a Location for Your MultiPASS
- Do you have everything?
  Check that nothing is missing when the unit is unpacked.
- Removing shipping materials
  Peel off all strips of tape from the unit. Don't forget to remove the protective sheet from the separation roller, in the scanner section.
- Assembling your MultiPASS
  Install the accessories, Sending Document support, Document support for scanned documents, Output tray extension, etc.
- Making connections
  Connect the Telephone line, Extension phone or Answering machine, Parallel cable (for PC).
- Powering up
  Connect the power cord and check that power is supplied.
- #5 TYPE setting (Service data setting)
  Set the country type to suit the communication standard used in your country.
- Installing the BJ cartridge
  Unseal the BJ cartridge, and load it into the machine. The instructions for this operation are written on the printer cover.
- Loading paper
  Set paper in the auto sheet feeder, in **SELECT PAPER SIZE** under **FAX PRINTER SETUP**, set the size of paper that is to be used.
- Setting the **TEL LINE TYPE**
  Choose the setting the matched the type of line being used.
- Entering user information
  Enter user information, such as **DATE & TIME, UNIT TELEPHONE #, UNIT NAME**.etc.

## 1.2 Checking Operations

- Copy operation
  Make a copy, and check that the operation is normal.
- Communication test
  Transmit to, and receive from other facsimiles, and check that images are sent normally for transmission, and are printed normally for reception.

**What to do when trouble occurs**

Very rarely, during use, the display may go out, all the buttons may stop working, or some other trouble may occur because of strong electrical noise or a large amount of static. If such trouble occurs, initialize the RAM. During installation, we recommend that you perform the all clear operation after the power on. Refer to *NOTE: "All clear" when nothing works on Page 1-52* and *Chapter 3: 5.2.3 Service data setting (#5 TYPE) on Page 3-37*.

# 2. USER DATA FLOW

**NOTE**

This product differs from previous MultiPASS products in that it assumes that many of the user operable setting items can be set by connecting to a PC, and using the MultiPASS Desktop Manager Setup menu. This means that, in order to make these alterations when performing service, you will need a MultiPASS Desktop Manager enabled environment.

## 2.1 USER DATA FLOW (by Operation Panel)

Only items that can be programmed by operation panel, without using the PC, are listed.

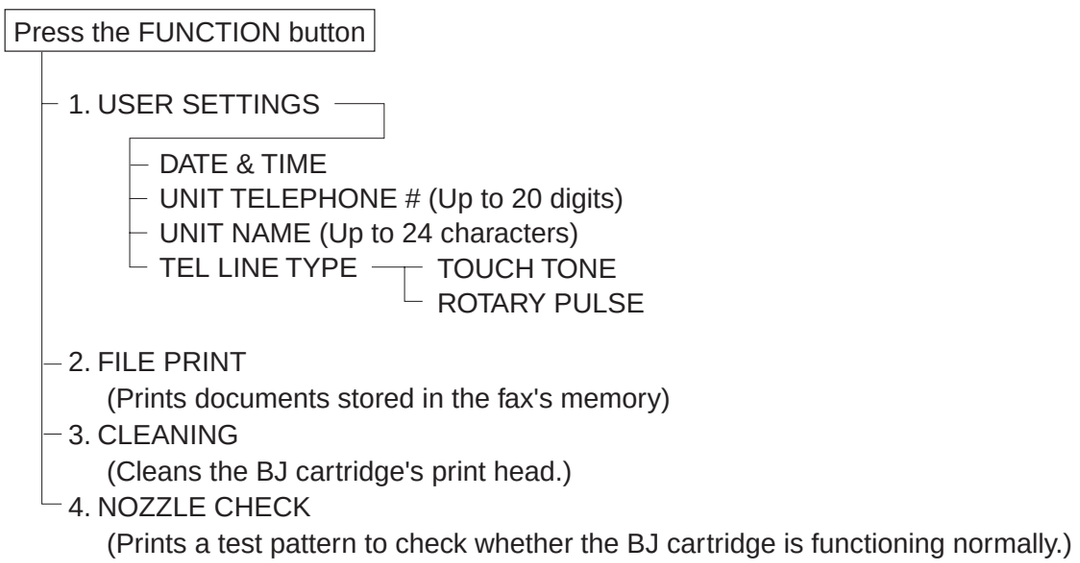

Press the FUNCTION button
1. USER SETTINGS
DATE & TIME
UNIT TELEPHONE # (Up to 20 digits)
UNIT NAME (Up to 24 characters)
TEL LINE TYPE
TOUCH TONE
ROTARY PULSE
2. FILE PRINT
(Prints documents stored in the fax's memory)
3. CLEANING
(Cleans the BJ cartridge's print head.)
4. NOZZLE CHECK
(Prints a test pattern to check whether the BJ cartridge is functioning normally.)

**Figure 4-1 User Menu Settings (1/6)**

## 2.2 USER DATA FLOW (by MultiPASS Desktop Manager)

Items that the user can programmed using the MultiPASS Desktop Manager are listed. For details, see the MultiPASS Desktop Manager for Windows User' Guide.

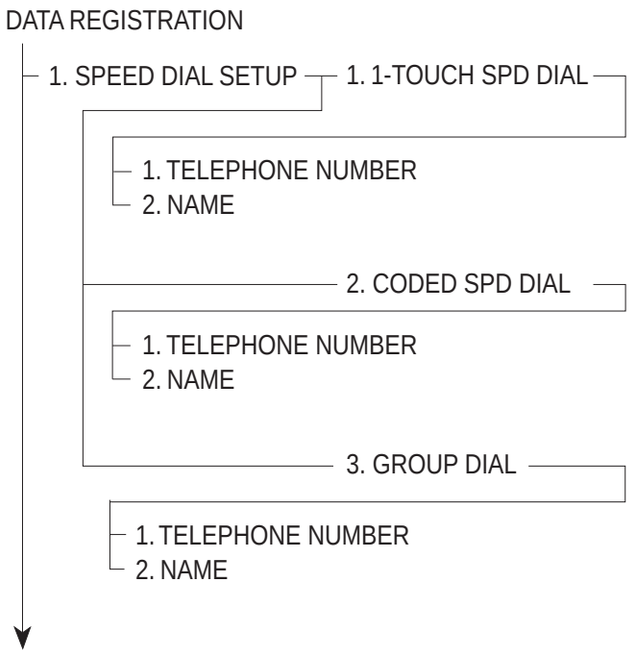
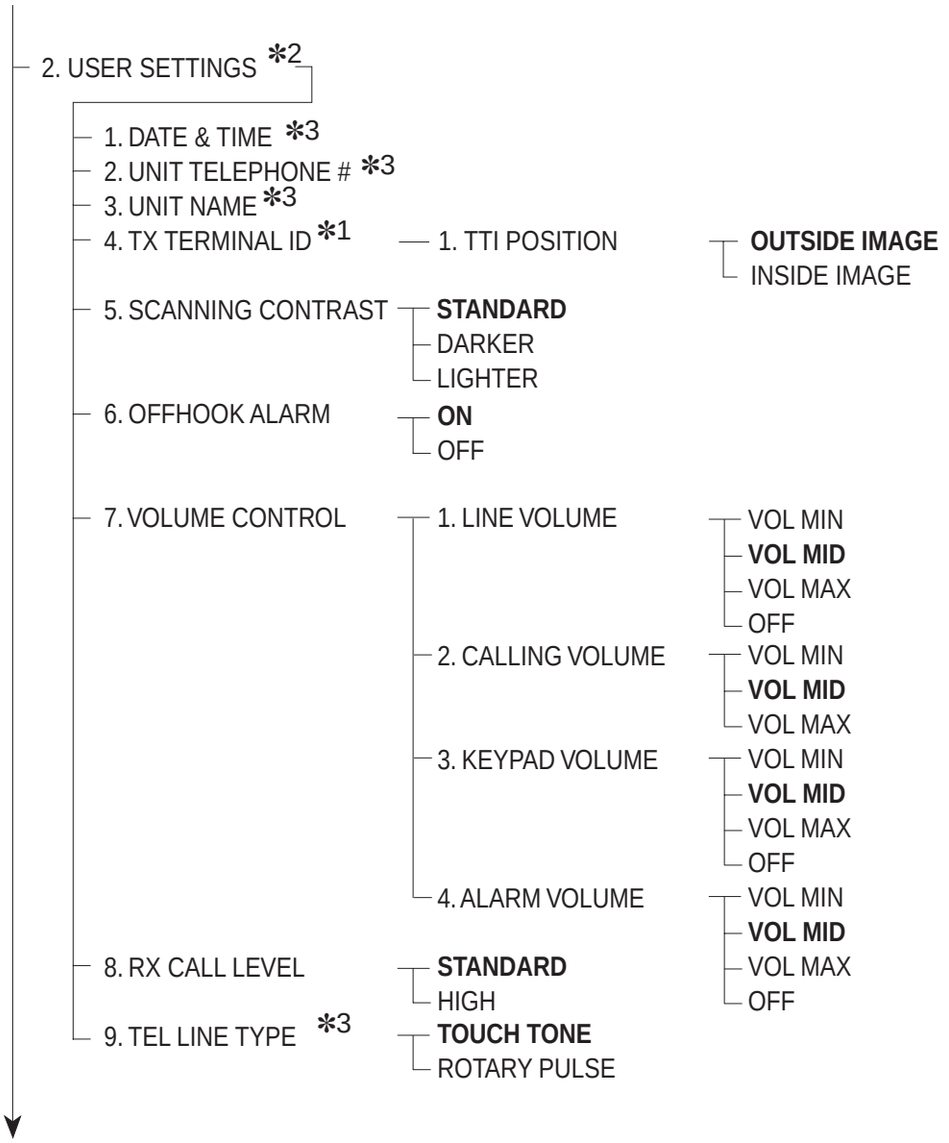
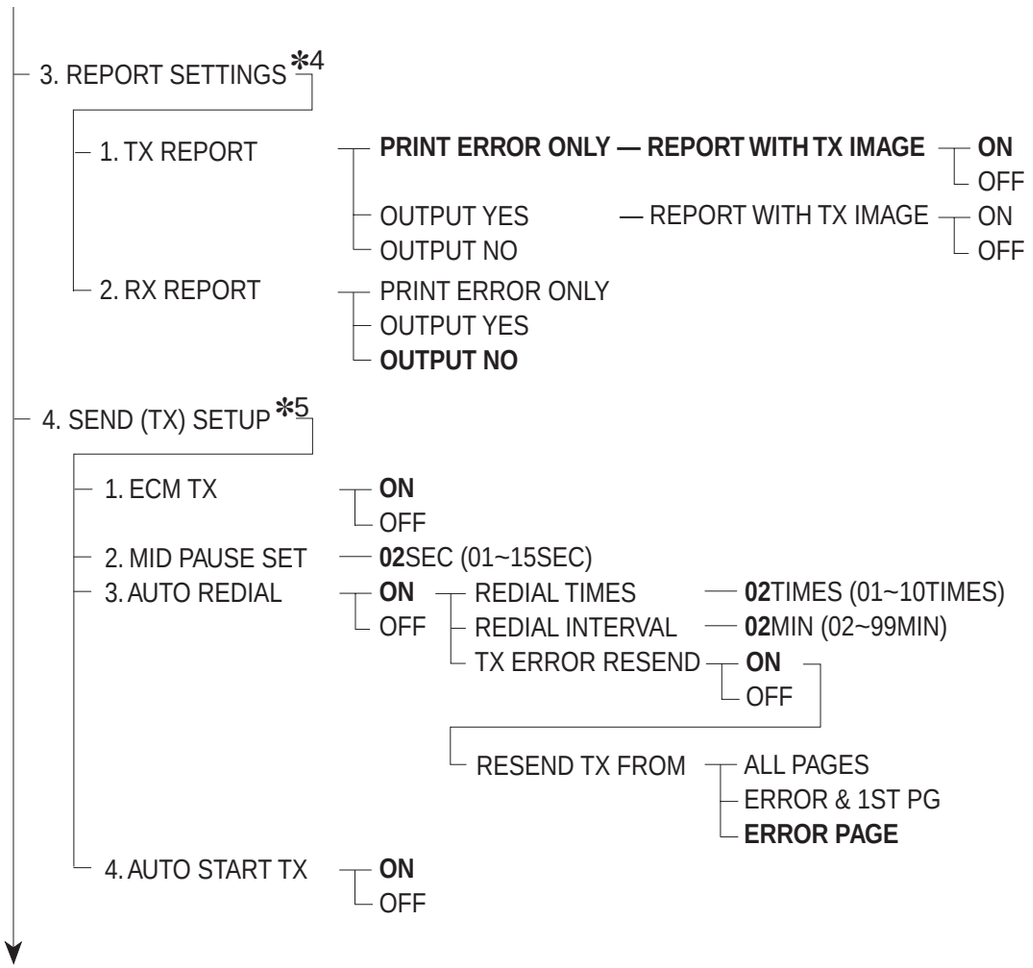



**Figure 4-2 User Menu Settings (2/6)**



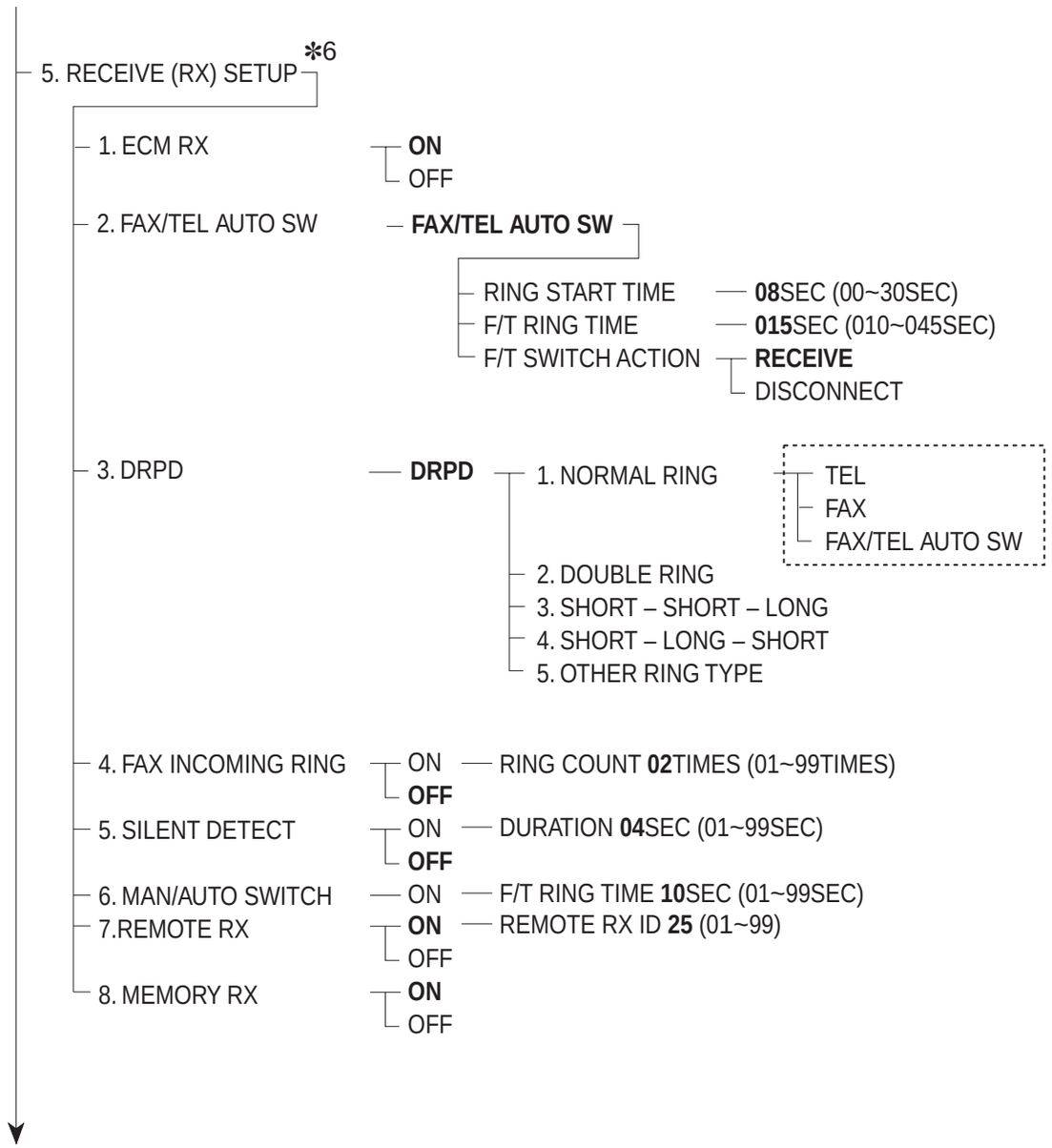

✻1 The **TX TERMINAL ID** is permanently displayed. Also. the **TELEPHONE # MARK** is **"FAX"** only.
✻2 **AUTO HALFTONE** is permanently **ON**. It cannot be turned **OFF**.
✻3 These items can be entered even with key operation.

**Figure 4-3 User Menu Settings (3/6)**



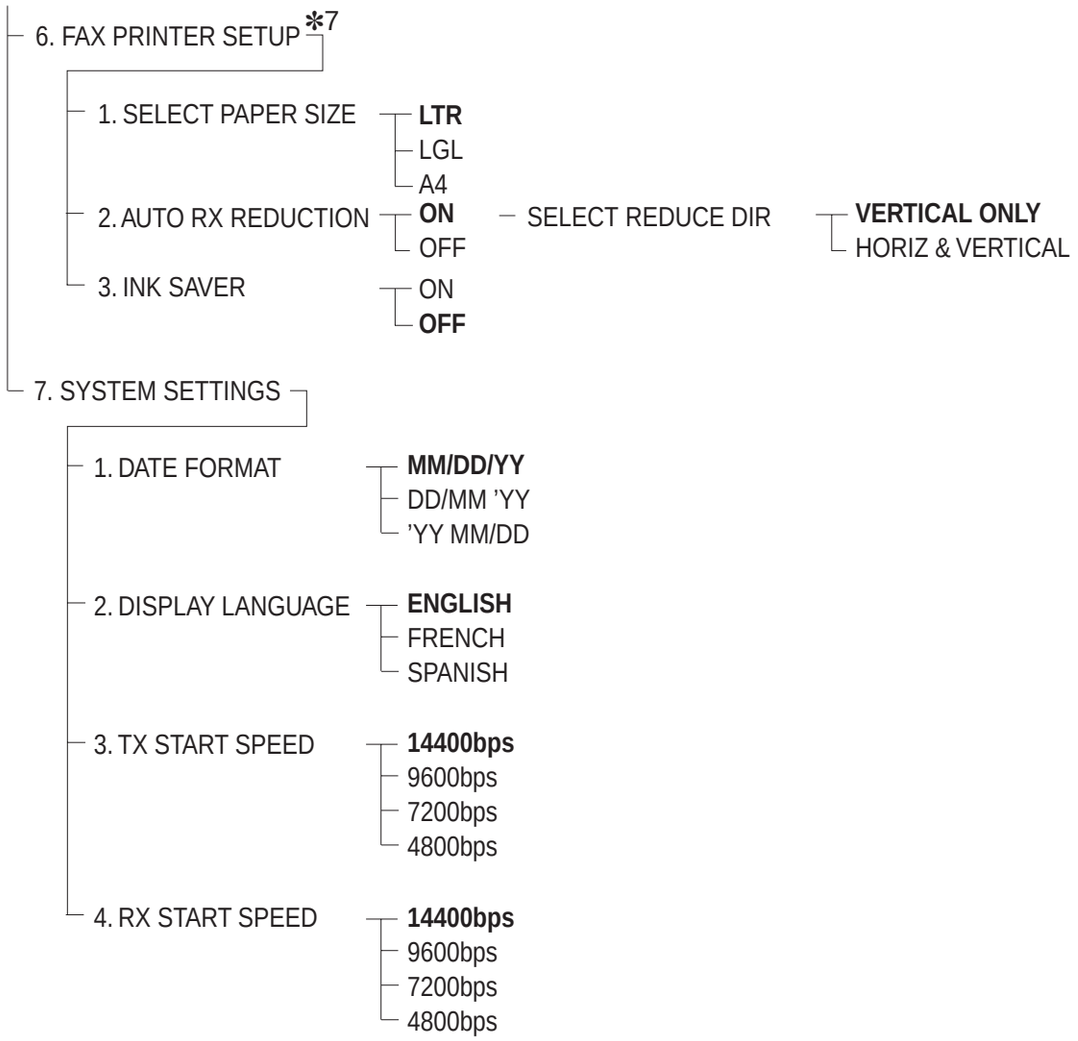

✻4 The **ACTIVITY REPORT** is permanently set to **AUTO PRINT**.
The **ACTIVITY REPORT** cannot be separated into **TX** and **RX** output.
✻5 **ERASE FAILED TX** is permanently **ON**. Which means that images from failed transmissions will be erased.

**Figure 4-4 User Menu Settings (4/6)**




✻6 **MAN/AUTO SWITCH** is permanently **OFF**. **MEMORY RX** is always **ON**.

**Figure 4-5 User Menu Settings (5/6)**




*7 Using the BC-20/BC-21 BJ cartridge, fax reception images and reports can be printed and copied. When using the BC-22 cartridge, **"INSTALL BC-21/20"** is displayed, the error alarm sounds, and printing is disabled.

**Figure 4-6 User Menu Settings (6/6)**

## 2.3 SPECIAL MODE FLOW (by Operation Panel)

NOTE

**SPECIAL MODE**

The User's Guide does not contain any mention of the *SPECIAL MODE*. This mode is to allow user complaints to be handled by giving instructions over the telephone, without using service mode. The functions of this mode are as follows.

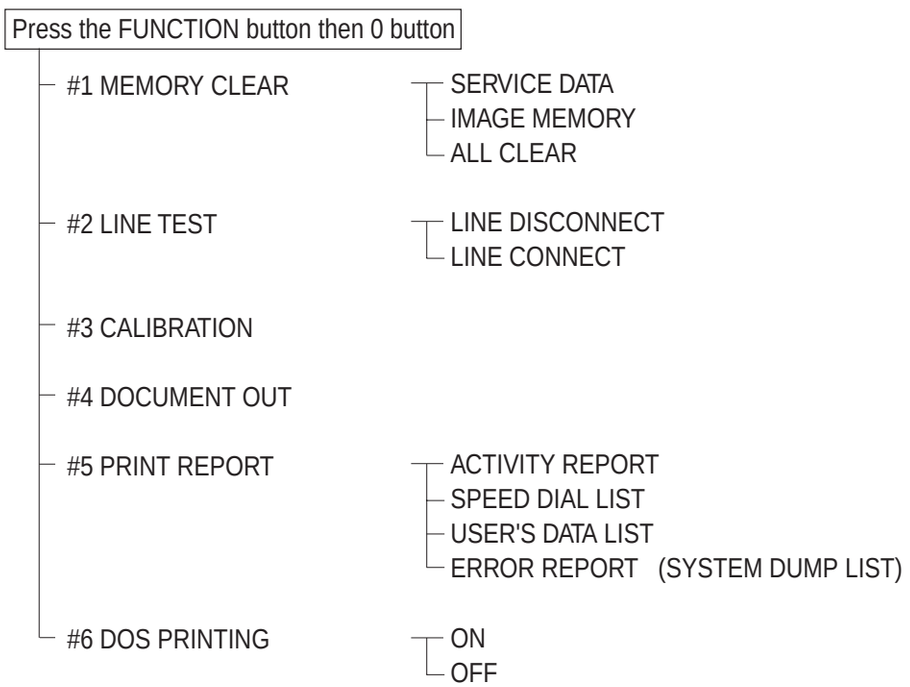



**Figure 4-7 Special Mode Settings**

**#1 MEMORY CLEAR**

SERVICE DATA → User data and service data #1 to #4 and #6 to #7 initialization.
IMAGE MEMORT → Image data initialization
ALL CLEAR → All user data, service data, activity management data, and image data initialization (except COUNTER)

**#2 LINE TEST**

Line connection test with keys 0 and 1.
Press 1 → Line connect (CML relay set ON and H relay set OFF)
Press 0 → Line disconnect (CML relay set OFF and H relay set ON)

**#3 CALIBRATION**

Performs the same operation as CS SHADE ADJUST in TEST MODE.
For details, see *page 3-6*.

**#4 DOCUMENT OUT**

Runs the document feed motor in reverse.
When a document gets wound around the document feed roller, the document can be removed without taking the roller apart.
Be careful not to damage the document guide, etc.

**#5 PRINT REPORT**

| | | |
|---|---|---|
| ACTIVITY REPORT | → | Prints Activity report |
| SPEED DIAL LIST | → | Prints One-touch dial list, Coded speed dial list, Group dial list in order. |
| USER'S DATA LIST | → | Prints User's data list |
| ERROR REPORT | → | Prints System dump list |

**#6 DOS PRINTING**

Set the DOS emulation mode to printer mode.
Returns to normal mode when OFF.

# 3. MAKER CODE

The 1-byte maker code displayed on the error dump list corresponds to the list of makers shown on the following page.

REFERENCE

For a sample of a dump list containing maker codes, see *pages 3-64 ~ 3-66*

| Upper nibble: Hexadecimal notation / Binary notation ↓ \ Lower nibble: Hexadecimal notation / Binary notation → | 0<br>0000 | 1<br>0001 | 2<br>0010 | 3<br>0011 | 4<br>0100 | 5<br>0101 | 6<br>0110 | 7<br>0111 | 8<br>1000 | 9<br>1001 | A<br>1010 | B<br>1011 | C<br>1100 | D<br>1101 | E<br>1110 | F<br>1111 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 0000 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 1 0001 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 2 0010 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 3 0011 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 4 0100 | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ |
| 5 0101 | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |
| 6 0110 | MASTER NET | | | | KONICA | | MITA | | | | BROTHER | | | | | |
| 7 0111 | | | | | | | | | | | | | | | | |
| 8 1000 | ANRITSU | | IWASAKI (DEX) | | OKI | | CASIO | | Canon | | SANYO | | SHARP | | TAMURA | |
| 9 1001 | TOSHIBA | | NEC | | JRC | | HITACHI | | FUJIXEROX | | FUJITSU | | MATSUSHITA ELECTRIC | | PANASONIC (MATSUSHITA) | |
| A 1010 | MITSUBISHI | | MURATA | | RICHO | | OMRON | | TOYO | | NITTSUKO | | MATSUSHITA COMMUNICATION | | TEC | |
| B 1011 | LOGIC SYSTEM INTER. | | OKURA | | SONY | | HITACHI TELECOM TECH. | | HITACHI SOFT WARE | | KUONI | | IBM JAPAN | | SILVER | |
| C 1100 | | | | | | | | | | | | | | | | |
| D 1101 | | | | | | | | | | | | | | | | |
| E 1110 | | | | | | | | | | | | | | | | |
| F 1111 | | | | | | | | | | | | | | | | |

○: National organization △: NTT □: KDD

**Figure 4-8 Maker Code**

# MultiPASS C3000

## Service Manual

*Part 2: Printer*

# 1. FEATURES

### Built-in BJ color printer design

The build-in printer works the same as the Bubble jet Full-color printer. This space-saving design occupies a minimum of desk space and makes it easy to work with the facsimile.

### Convenient paper handling

The printer is equipped with an automatic sheet feeder that holds up to 100 sheets of A4/B5/LTR/LEGAL size Plain paper.

Printing is also possible on Coated paper, Transparency, Envelope, Back print film, Glossy paper, High gross film, Fabric sheet.

### Excellent print quality

The high-performance print head of the ink cartridge offers 720 × 360 dots per inch (dpi) for high resolution graphics.

### Automatic printer ON/OFF

When you print data using the MultiPASS Server & MultiPASS printer driver under Windows, the printer mode changes automatically and returns to fax mode after printing.
(The printer is turned on and off by means of software.)

# 2. SPECIFICATIONS

## 2.1 Basic Specifications

### Type

Serial dot matrix on-demand thermal ink jet printer

### Auto sheet feeder capacity

| | |
|---|---|
| Plain paper | Max. 10 mm (approx. 100 pages) |
| Envelopes | 10 envelopes (commercial, number 10 or european DL-size) |
| Transparencies | 50 sheets |
| Back print film | 10 sheets |

### Print control mode

Canon extended mode
(Canon extended mode shall be selected when the MultiPASS printer driver is used.)

### Printing speed

BC-20 (Black printing) up to 5 pages per minute (1500 characters per page)
BC-21 (Black printing) up to 2 pages per minute.
BC-21 (Color) approx. 0.3~0.8 pages per minute.

### Print direction

Uni-directional
(Print direction automatically changes according to optimum printing directional control.)

### Maximum print width

8.2"

### Paper feed method

Automatic sheer feed and manual feed

**Paper size**

LETTER/LEGAL/A4/B5
Envelope commercial, number 10 (4.1"×9.5")
Envelope european DL-size (8.66"×4.33")

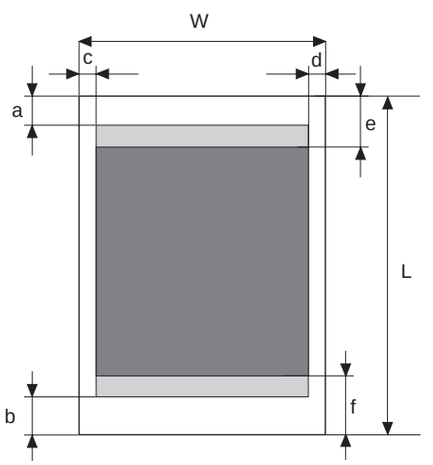
**Paper type**

Plain paper
Coated paper
Transparency (Canon transparency film CF-102)
Envelope (Commercial number 10 or DL-size)
BPF (Canon back print film BF-102)
High gross film (Canon High gross film HG-101)
Glossy paper (Canon glossy paper GP-101)
Fabric sheet (Canon Fabric sheet FS-101)
T-Shirt transfers (Canon T-Shirt transfers TR-101)

### Printing range

Plain paper and Special media

W × L = Min. 7.17 × 1012 inch(182 × 257 mm)
Max. 8.5 × 14.0 inch(216 × 356 mm)




Feed direction

a = (Plain paper , etc.) 0.12 inch/3.0 mm
(Fabric sheet only) 1.5 inch/38.1 mm

e = 0.81 inch/20.5 mm

b = 0.27 inch 7 mm

f = 0.81 inch/20.5 mm

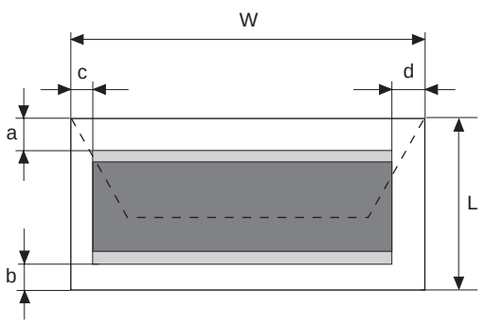
c = (A4) 0.13 inch/3.4 mm
(LTR, LGL) 0.25 inch/6.4 mm

: Recommended printing area

: Printable area
(contains recomended printing area)

Envelopes

W × L = (COM #10)
9.48 × 4.17 inch(241 × 106 mm)
(DL)
8.66 × 4.33 inch(220 × 110 mm)




a = 0.12 inch/3.0 mm

b = 0.28 inch/7 mm

c = 0.27 inch/6.4 mm

d = (COM #10) 1.24 inch/31.4 mm
(DL) 0.41 inch/10.4 mm

e = 0.81 inch/20.5 mm

f = 0.81 inch/20.5 mm

Feed direction

**Figure 1-1 Printing Range**

## 2.2 Interface Specifications

The parallel interface sends 8 bits (one byte) of data at one time and is transistor-transistor-logic (TTL) compatible.

### Interface type

IEEE P1284/Bi-directional parallel

### Data transmission

8-bit parallel interface (IBM PC or compatible)

### Synchronizing signal

STROBE signal from the computer

### Handshake

BUSY/ACKNLG

### Interface connectors

| | |
|---|---|
| Printer side | Amphenol 57-40360 or equivalent |
| Cable side | Amphenol 57-30360 or equivalent |

### Recommended interface cable

| | |
|---|---|
| Type | Twisted-pair shielded cable |
| Material | AWG No.28 or larger |
| Length | Up to 6.56 feet (2.0 m) |

### Signal voltage levels

| | |
|---|---|
| Low level | 0.0 V to +0.4 V |
| High level | +2.4 V to +5.0 V |

**Signal circuit**

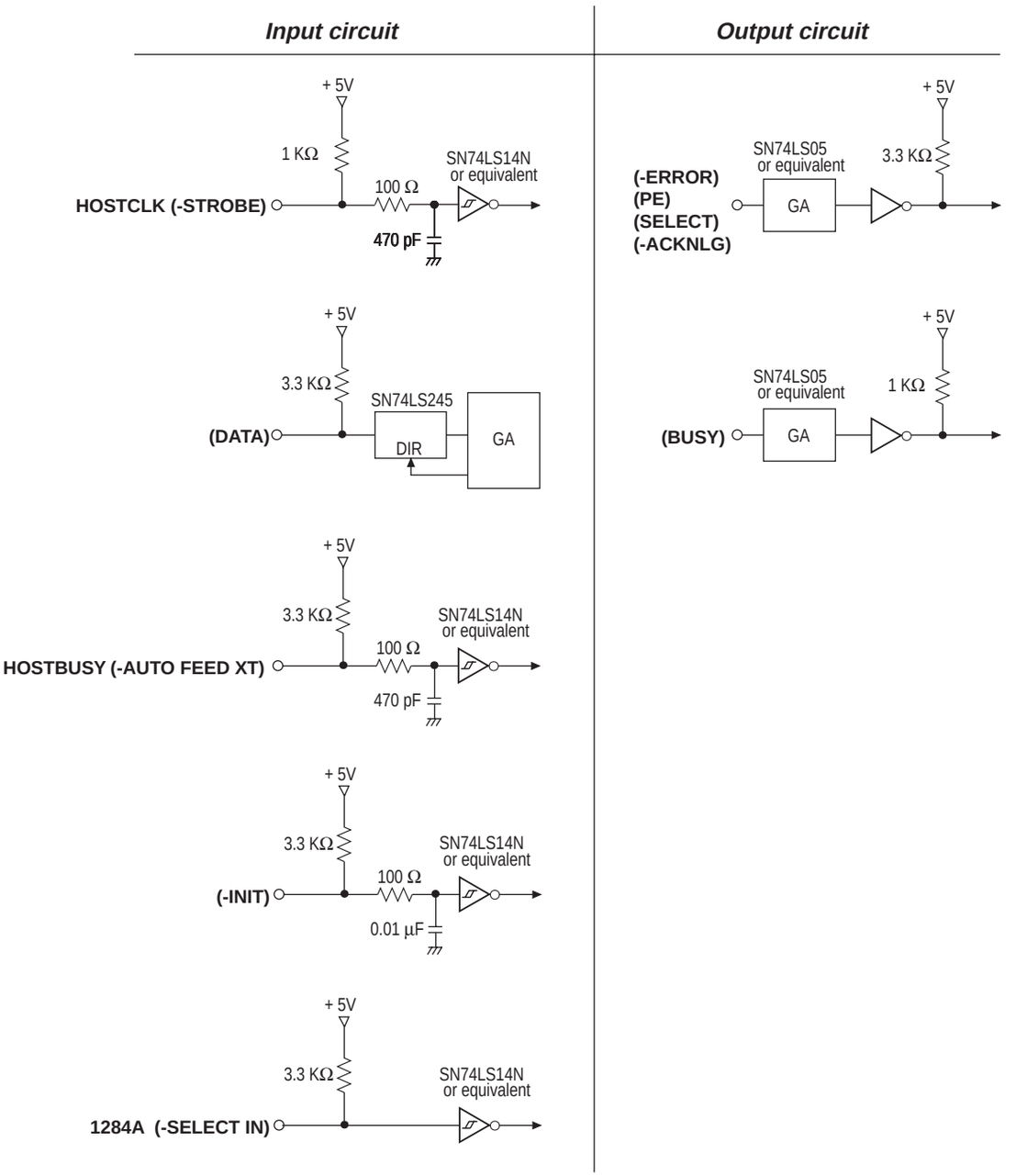



**Figure 1-2 Signal Circuits**

### Connector signals

The following table lists the signals and input/output status of the pin assignments used for parallel communication.

| Pin No. | Signal | I/O | Pin No. | Signal | I/O |
|---|---|---|---|---|---|
| 1 | -STROBE | Input | 19 | -STROBE -RET*1 | |
| 2 | DATA1 | Input | 20 | DATA1 -RET | |
| 3 | DATA2 | Input | 21 | DATA2 -RET | |
| 4 | DATA3 | Input | 22 | DATA3 -RET | |
| 5 | DATA4 | Input | 23 | DATA4 -RET | |
| 6 | DATA5 | Input | 24 | DATA5 -RET | |
| 7 | DATA6 | Input | 25 | DATA6 -RET | |
| 8 | DATA7 | Input | 26 | DATA7 -RET | |
| 9 | DATA8 | Input | 27 | DATA8 -RET | |
| 10 | -ACKNLG | Output | 28 | -ACKNLG -RET | |
| 11 | BUSY | Output | 29 | BUSY -RET | |
| 12 | P.E. | Output | 30 | P.E. -RET | |
| 13 | SELECT | Output | 31 | -INIT | Input |
| 14 | -AUTO FEED XT*2 | Input | 32 | -ERROR | Output |
| 15 | No Connection | | 33 | GND | |
| 16 | GND | | 34 | No Connection | |
| 17 | GND | | 35 | +5.0V*3 | Output |
| 18 | +5V*4 | Output | 36 | -SLCT IN*2 | Input |

*1. All -RETs are connected to GND.

*2. These signals are valid only in Epson LQ mode.

*3. This signal is connected to +5.0V via 3.3kΩ resistor.

*4. The level is raised to +5V at 390Ω resistor.

### Signal descriptions

-STROBE

When the printer receives a low -STROBE pulse of width greater than 0.5µs from the computer, it reads the data from the interface and makes the BUSY line high.

DATA

These signals are the 8 bits of parallel data from the computer. A high level indicates a logical 1; a low level, a logical 0. The printer reads the DATA lines when a -STROBE pulse is received.

-ACKNLG

The ACKNLG pulse tells the computer that the printer has read the data from the previous -STROBE pulse. An -ACKNLG pulse is also generated when the printer is powered on, or at the completion of printer initialization by an -INIT signal requested from the computer.

BUSY

When the printer makes BUSY high, it cannot receive data. The BUSY line goes high in response to a -STROBE pulse. This line remains high until the data are read. BUSY is also high under the following conditions:

- The receive buffer is full of data.
- The printer receives an -INIT signal.
- A printer error condition, such as out-of-paper, occurs.

P.E. (Paper End)

The printer sets P. E. high when it is out of paper or when a paper jam occurs. P. E. remains high until the operator loads paper and presses the *RESUME* button.

SELECT

When the printer is ready, it sets the SELECT line high. The SELECT line goes low when:

- An error condition, such as out-of-paper, occurs.
- The printer receives the Printer Deselect command. It ignores all incoming data except DC1, which returns the printer to a selected state.

-AUTO FEED XT

If this signal is low when the printer is initializing, the printer automatically feeds the paper one line when it receives a carriage return (CR) control code. This signal is valid only in Epson LQ mode.

-INIT

-INIT from the system resets the printer to its initial power-on state. The BUSY line goes high, and any received data are printed. When -INIT goes low, the printer resets itself to the power-on default state.

-ERROR

The printer sets the ERROR line low if it detects an error, such as an out-of-paper condition.

-SLCT IN

When this signal is high at initializing the printer, the DC1 and DC3 control codes are valid; otherwise, they are invalid. This signal is valid only in Epson LQ mode.

### Timing chart

The parallel interface transfers data in one direction only: from computer to printer. The data path is 8 bits wide. The printer and the computer synchronize data transfer with the interface signals, -STROBE, -ACKNLG, and BUSY.

When the computer is ready to send a byte of data to the printer, it puts the byte of data on the data lines (DATA 1 through DATA 8). Then the computer sends a -STROBE pulse to the printer. The printer responds with a BUSY signal.

When the printer receives the data, it pulses the -ACKNLG line. This signals the computer that the printer has read the byte of data into the printer memory. If the printer buffer is not full and it can receive more data, it removes the BUSY signal.

The timing charts that follow illustrate the data and handshake lines during the transfer of one data byte from the computer. DATA 1 through DATA 8 and the -STROBE line are driven by the computer; the -ACKNLG line is driven by the printer.

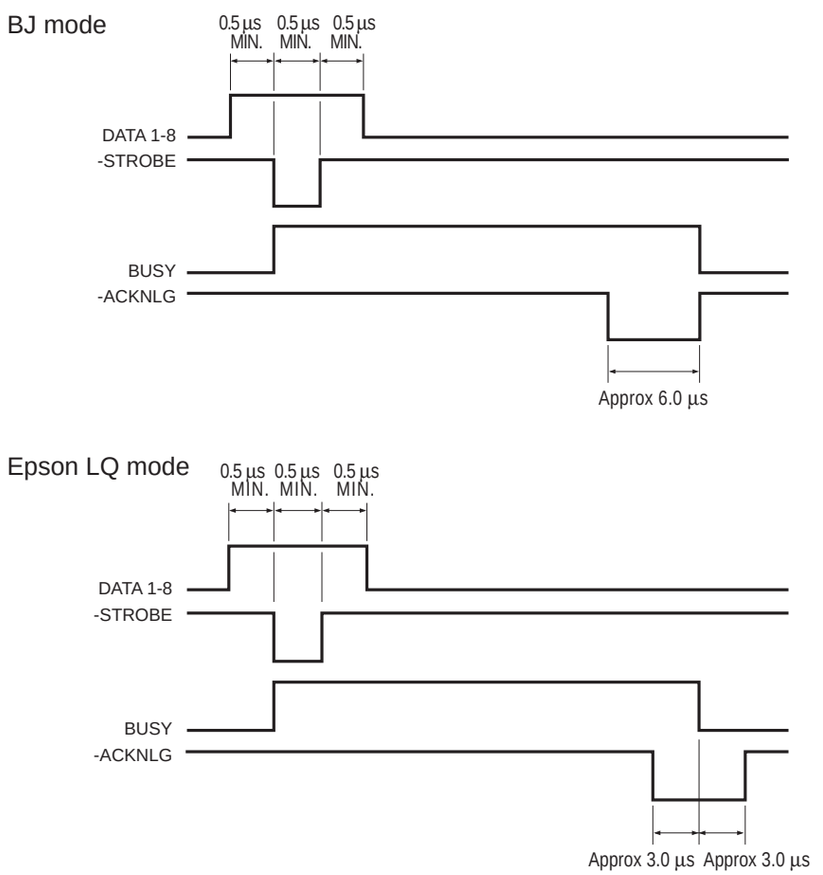



**Figure 1-3 Interface Timing**

# 3. OVERVIEW

## 3.1 Interface Connector

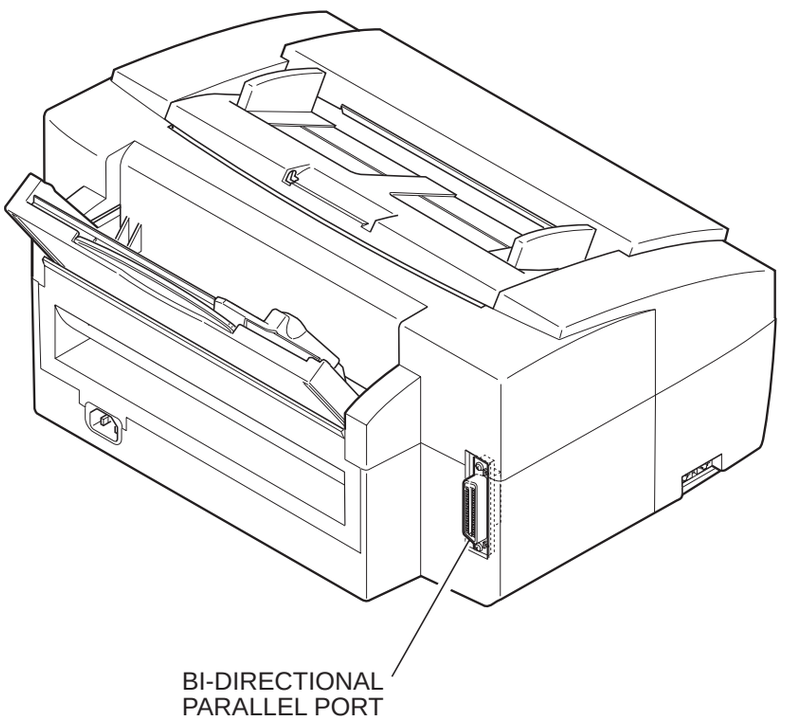
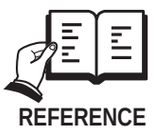



**Figure 1-4 Interface Connector**

## 3.2 Printer Operation Panel




See *Part 1: Facsimile, Chapter 1: General Description*, for details.

# 4. SAFETY & PRECAUTIONS

## 4.1 Personal Hazards

REFERENCE

For details on danger to personnel, see *Part 1: Facsimile, Chapter 1: 5.SAFETY & PRECAUTIONS*.

## 4.2 General Cautions

### 4.2.1 Connecting the interface cable

#### a) Electrostatic discharge

To protect the interface circuit from electrostatic discharge damage when connecting the interface cable, never touch the parallel interface connector terminals.

#### b) Rush current

To protect the interface circuit from rush current damage when connecting or disconnecting the interface cable, make sure that the computer power is off and the fax outlet is pulled out to turn the power off.

### 4.2.2 Data lost when power cord is pulled out

When the power cord is pulled out, following data will be lost:

- Downloaded font image in the DRAM.
- Current print data in the DRAM (receive/print buffer).
- Current printer settings by application software.

### 4.2.3 Data reset

When this fax is reset by service data #8 CLEAR, the BJ printer settings will be changed to the default settings.

REFERENCE

For detailed information about service data #8 CLEAR, see *Part 1: Facsimile, Chapter 3: 5.2 Service Data Setting on page 3-33*.

# 5. RESTRICTIONS

While in the printer mode, some operations are restricted as follows:

| Yes | No | Operation |
|---|---|---|
| ✔ | | Memory Fax Reception |
| | ✔ | Regular Fax Reception (Document printed) |
| ✔* | | Memory Fax Transmission |
| ✔ | | FAX/TEL Switching |
| ✔ | | Extension Telephone Communication (Connected to external jack) |
| ✔ | | Answering Machine (Connected to external jack) |

* Memory Tx in the printer mode cannot be set. Call operations for preset memory Tx are carried out even in the printer mode.
Memory Tx : Redial standby for memory transmission.

# 1. THEORY OF OPERATIONS

## 2.1 Outline

In the facsimile mode, the printer part prints the received image from the facsimile circuit as described in Part 1. In the printer mode, the printer part prints the character and image data from the computer via the centronics type 8-bit parallel interface.

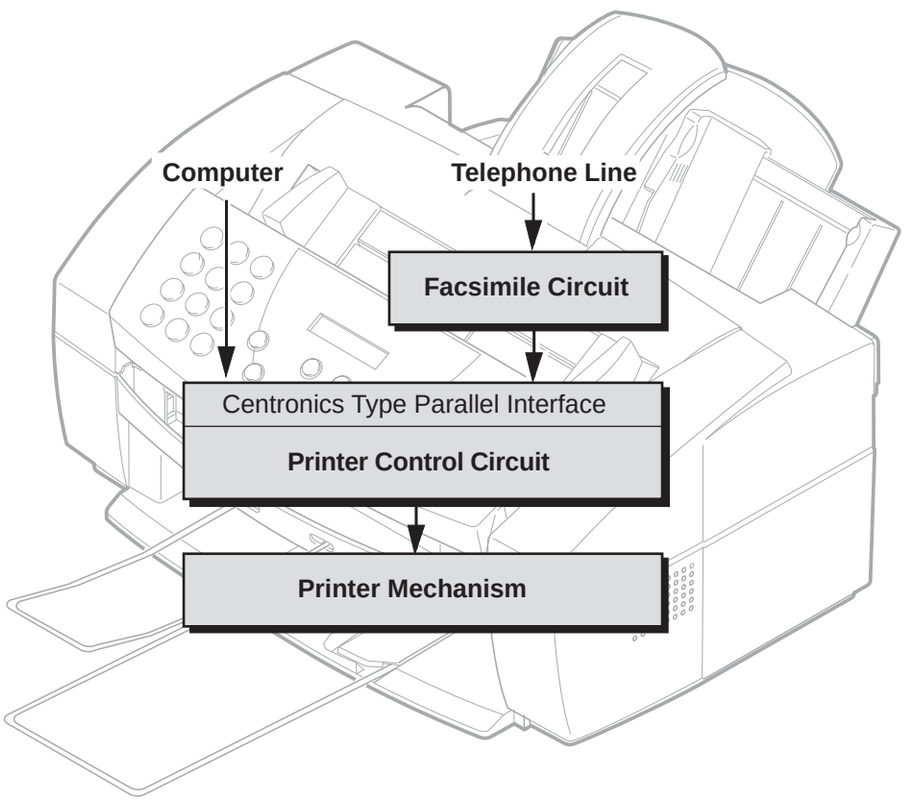
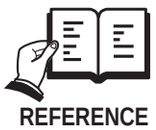



**Figure 2-1 Printer Outline**

## 2.2 Mechanical Overview




For details on mechanical overview of printer mechanism, see *Part 1: Facsimile, Chapter 2: Technical Reference*.

## 2.3 Data Flow

### 1) Interface

Character codes, control codes, and image data conforming to the printer's character table are sent to the interface from the computer. The data are received when the printer is in on-line standby, or when the carriage changes directions during printing.

### 2) Input buffer

Data received from the interface are stored in the printer DRAM's built in input (reception) buffer.

### 3) Data analysis and printer buffer

The MPU analysis the data stored in the input buffer, and printing image data for each nozzle of the BJ cartridge are stored in the printer DRAM's built-in print buffer.

If there are character data, the Control/CG ROM font image data are stored in the print buffer. Control codes are used for switching print modes, etc. The image data are already formatted for each nozzle of the BJ cartridge, and are stored as is in the print buffer.

### 4) Printing

When control codes with a CR/LF, etc, print start function are processed, and the print buffer becomes full, the image data stored in the printer buffer are sent to the BJ cartridge and printed out.

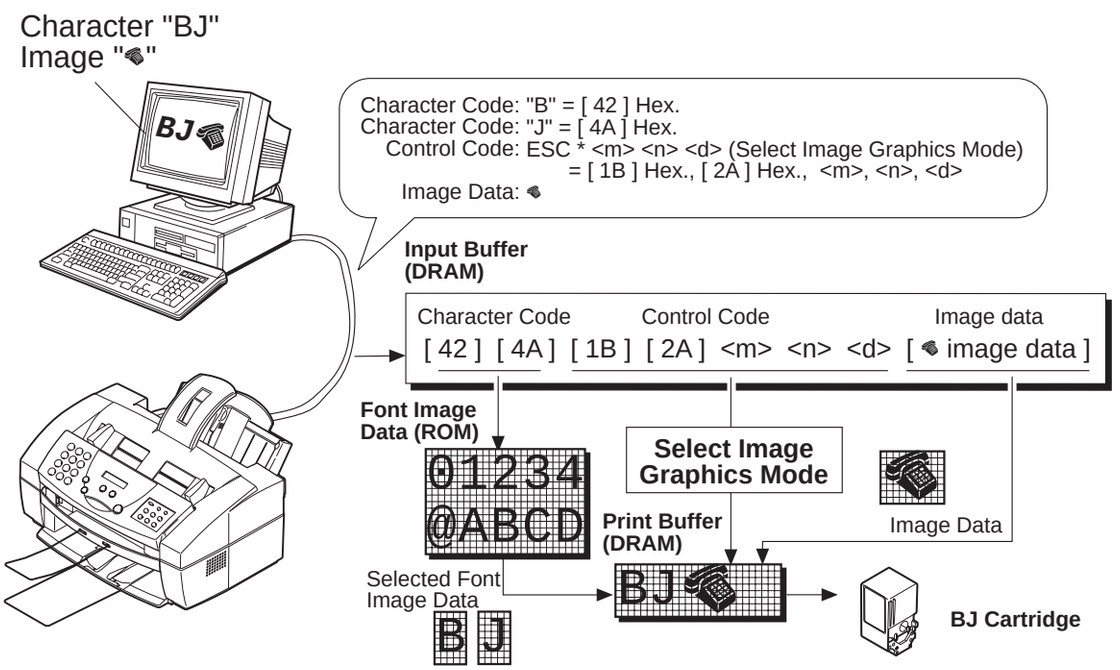

Character "BJ"
Image "✎"
BJ
Character Code: "B" = [ 42 ] Hex.
Character Code: "J" = [ 4A ] Hex.
Control Code: ESC * <m> <n> <d> (Select Image Graphics Mode)
= [ 1B ] Hex., [ 2A ] Hex., <m>, <n>, <d>
Image Data: ✎
Input Buffer (DRAM)
Character Code
Control Code
Image data
[ 42 ] [ 4A ] [ 1B ] [ 2A ] <m> <n> <d> [ ✎ image data ]
Font Image Data (ROM)
01234
@ABCD
Select Image Graphics Mode
Image Data
Print Buffer (DRAM)
Selected Font Image Data
B J
BJ
BJ Cartridge

**Figure 2-2 Data Flow (image)**

## 2.4 Printing

The printer prints the fonts horizontally, and feeds the paper vertically.

The printing design of the fonts are written into the font ROM*, and is usually made up of 360 dpi; 48 nozzles × 36 dots × 2 lines. Nozzles 49 to 60 and 113 to 124 are for spacing to next line, and for IBM block graphic character printing. Nozzles 61 to 64 and 125 to 128 are not used in printer mode**.

The default character pitch in the horizontal direction is 10 cpi (characters per inch). The default line feed pitch in the vertical direction is 1/6 inch line feed (6 lpi).

*As Microsoft Windows® or Windows 95® creates the font image data in the computer, and then transmits them, the font image data in the Control/CG ROM cannot be used.

**Because there is no larger than 1/6 inch line feeding in the printer mode. In the facsimile mode, all 128-nozzles are used for printing.

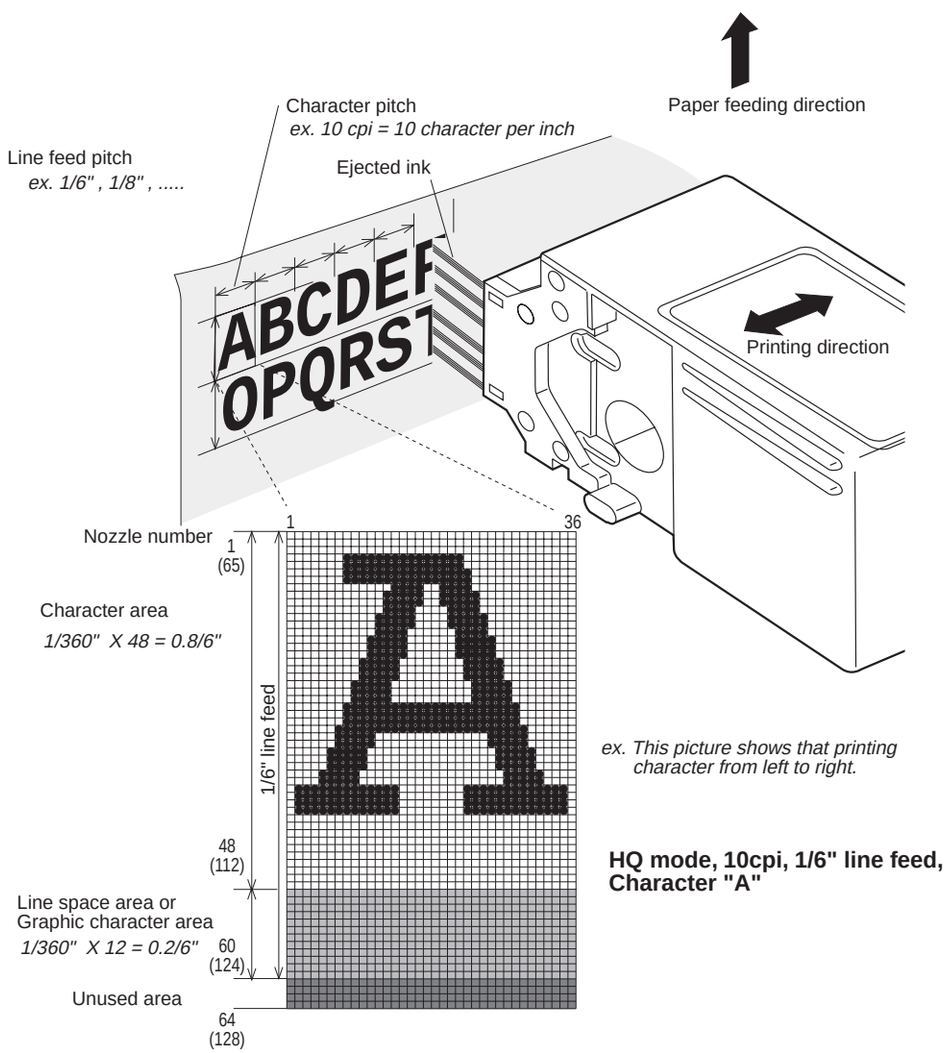



**Figure 2-3 Character Printing**

## 2.5 Circuit Overview

### 2.5.1 Printer circuit

This printer circuit is the same as the circuit for the facsimile printer. This section explains the operations of the circuit in printer mode.

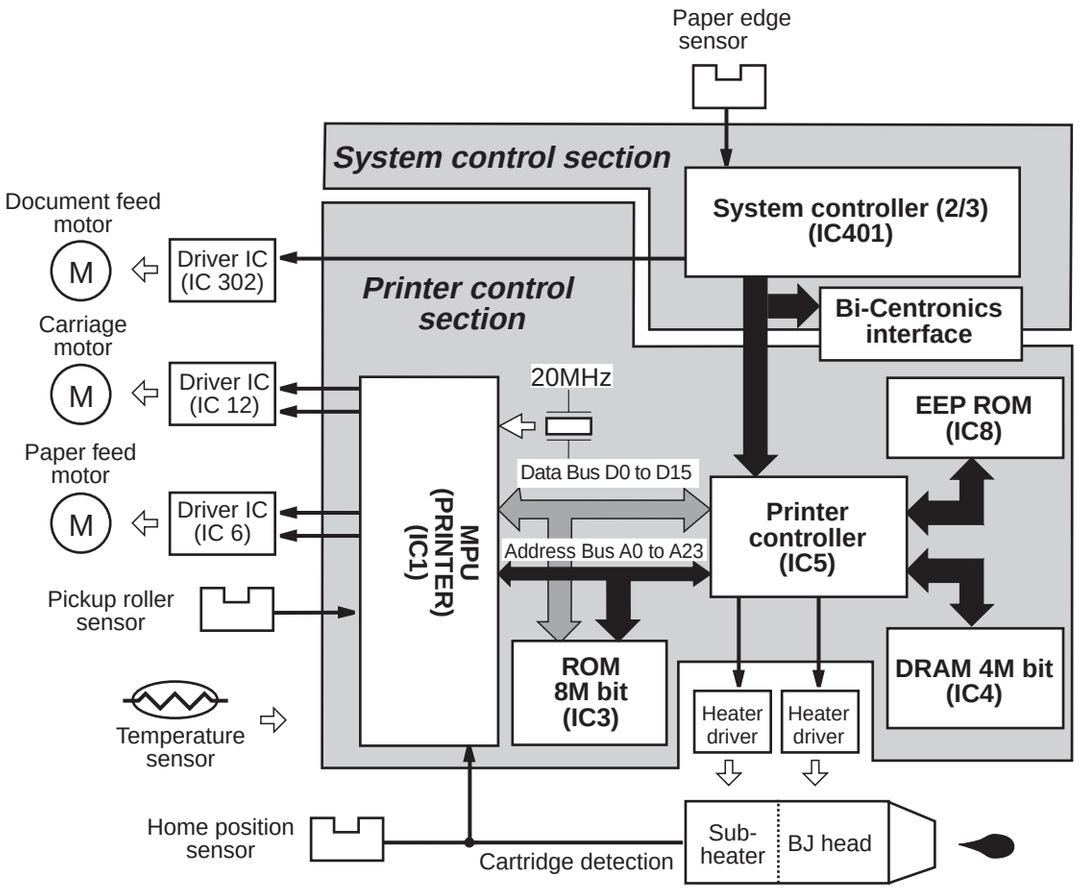



**Figure 2-4 Printer Circuit Block Diagram**

**a) MPU (IC1)**

Printer controller (IC5) is controlled by the Control/CG ROM (IC3) program to control printer mode operations.

**b) Control/CG ROM (IC3)**

Besides the printer hardware control program and font image data, the following data are stored in the Control/CG ROM.

- Emulation software

  This is the control program for the printer, which can emulate either IBM Proprinter X24E, or EPSON LQ-2550.
- Font image data

  The 360 dpi character design data for each of the BJ cartridge nozzles.

  When the printer is emulating IBM Proprinter X24E, the character designs from Character Set 1, 2, All Characters Chart, Code Page; 437(USA)/ 850 (Multilingual)/ 852 (East Europe)/ 855 (Cyrillic)/ 857 (Turkish)/ 860 (Portuguese)/ 863 (Canadian French)/ 864 (Arabic)/ 865 (Norway)/ 869 (Greek) can be selected. When the printer is emulating EPSON LQ-2550, the EPSON Italics Character Set, EPSON Graphics Set can be selected, and the language chosen from the International Character Set.
- Mask patterns in fine mode

**c) Printer controller (IC5)**

The main functions of the system controller as follows:

- Interface controller

  The centronics interface controller receives 8-bit parallel data sent from the computer in synchronization with the data strobe pulse by BUSY / -ACK handshaking It controls other interface signals. The data received from the interface are stored in the receive buffer in DRAM, and is analyzed by the MPU. If the printer initialize signal -INIT is input to the printer controller and MPU from the interface, the printer controller outputs the BUSY status immediately, and the MPU prints printing data stored in the print buffer, then initializes the printer.
- Buffer controller

  The buffer controller automatically writes received data into the receive buffer in DRAM, controls the remaining data in the receive buffer, reads data from the receive buffer, and clears data after reading.

**d) DRAM (IC4)**

Besides the printer hardware control data storage area, the DRAM comprises the following;

- Input buffer

  Reception data from the interface are stored momentarily. The data are then analyzed by the MPU, and then erased to make room for the next data.
- Printer buffer

  Two lines of BJ cartridge print data are stored. After being printed out, the data are then erased to make room for the next data.
- Download buffer

  When emulating the IBM Proprinter X24E, besides the data stored in the ROM, font image data are transferred from the computer and stored.

## 2.6 720 dpi Printing/Smoothing Feature

### 2.6.1 Canon extension mode

In the Canon extension mode, the printer driver creates 720 dpi data for the horizontal axis and sends it to the printer, resulting in high-quality printing.

With a black BJ cartridge installed, the printer driver smoothies the printed character's edges at 720 dpi along the horizontal axis. The 720 dpi data for the horizontal axis is sent to the printer and the edges are smoothed at a high resolution.

When a color BJ cartridge is installed, the multi-value data of the picture elements processed by the printer driver for color correction, etc., is assigned three values (no printing, single-dot printing, two-dot printing) for the picture elements. In the case of two-dot printing, the second dot is printed in the 720 dpi position. As a result, the degree of gradation is high in the printing.

### 2.6.2 Emulation mode

When a black BJ cartridge is installed for printing, the printed character's edges can be smoothed at a high resolution of 720 dpi along the horizontal axis. Dots along the character's edges are added or deleted for smoothing the edge. Along the horizontal axis, dots are also overlapped by a half-dot space. This eliminates jaggies and increases the equivalent horizontal resolution at twice.

This smoothing feature greatly improves low-resolution, 180 dpi characters. However, it does not give noticeable improvement to True Type fonts and illustrations.

Note that with a color BJ cartridge installed, the emulation mode's smoothing feature cannot be used.

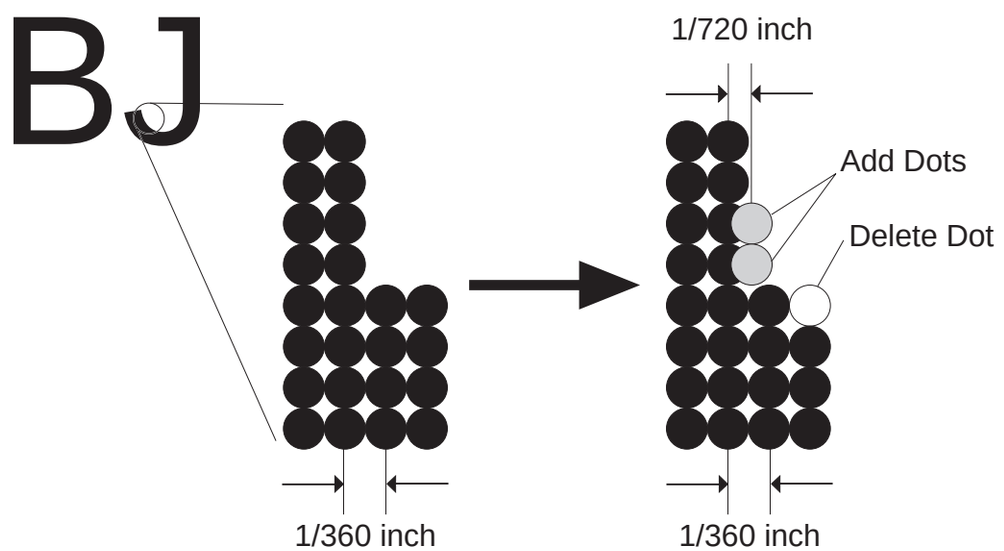



**Figure 2-5 720 dpi Printing/Smoothing Feature**

## 2.7 Printing Modes

### 2.7.1 Printing mode

Depending on the cartridge installed, the medium, the printing mode, the resolution, the print data, etc., the printer varies the carriage movement, bubble jet head driving frequency, etc., to attain high-quality printing without any bleeding or shifting in the printout.
When the 720 dpi printing/smoothing feature is used, the carriage feed pitch is set to 1/720 inch. Although this slows down the carriage speed, the bubble jet head drive frequency (ink ejection frequency) is increased so that the overall printing throughput decreases.

During color printing at a single pass, the different colors printed at the same time overlap, often causing the colors to run. By printing with three passes, color bleeding is less prone to occur since the color printed immediately before is stable by the time the next color is printed over it.
When print data is processed internally by the printer, the data is recognized and the number of ink nozzles to be used by the black ink is changed automatically.
For color printing with Color-HQ2, at 720 dpi, processing is executed in such a way to prevent the color and black inks from running at their mutual borders and to prevent white mist.
This processing is executed as follows:
During internal processing by the printer, the borders where the color and black inks meet are identified. Cyan and black ink are mixed in the printed black portion to suit the state of the distance and density of the black and color dots.
The printing method for the respective printing modes are listed below.

### 2.7.2 Photoprint mode

Photoprint mode can be used to obtain high level gradation print quality when using the Photo BJ cartridge. These cartridges contain a light density ink which achieves a high level of gradation by printing several times over the same dot.

The printer driver divides the pixel data into a maximum of 4-values (not printed, print 1 dot, print 2 dots and print 3 dots) enabling each pixel to be printed in up to 4 gradations. The printer therefore makes three passes using a maximum of 400% more ink than usual.
It is therefore necessary to use the exclusive print driver when printing with the Photo BJ cartridge.

The exclusive printer driver outputs multiple print data to the printer when photoprinting. If for some reason, a standard color BJ cartridge is installed and used for photoprinting, everything printed will be doubled in size in the carriage direction.
On the other hand, if color printing is performed with a Photo BJ cartridge, not only will printed images appear light, the user will be notified of a mis-match as images will be printed in half their normal size.

## Table 2-1 Printing Modes and Heating Method

### With a Black BJ Cartridge

| Printing Mode | Carriage Movement | Number of Nozzles | Heat Frequency [*1] |
|---|---|---|---|
| Bk-HQ | 1 pass | 128 nozzles | 6.51KHz [6.51KHz (13.02KHz)] |
| Bk-Fine1 | 4 passes | 32 nozzles | 6.51KHz [6.51KHz (13.02KHz)] |
| Bk-Fine2 | 4 passes | 32 nozzles | 6.51KHz [6.51KHz (13.02KHz)] |
| Bk-Fine-Cloth | 4 passes | 32 nozzles | 6.51KHz [6.51KHz (13.02KHz)] |
| Color-HQ1 | 1 pass | 128 nozzles | 6.51KHz [6.51KHz (13.02KHz)] |
| Color-HQ2 | 1 pass | 128 nozzles | 6.51KHz [6.51KHz (13.02KHz)] |
| Color-Fine1 | 4 passes | 32 nozzles | 6.51KHz [6.51KHz (13.02KHz)] |
| Color-Fine2 | 4 passes | 32 nozzles | 6.51KHz [6.51KHz (13.02KHz)] |
| Color-HS | 1 pass | 128 nozzles | 9.19KHz |

### With a Color BJ Cartridge

| Printing Mode | Carriage Movement | Number of Nozzles | Heat Frequency [*1] |
|---|---|---|---|
| Bk-HQ | 1 pass | 64 nozzles for black | 6.51KHz [6.51KHz (13.02KHz)] |
| Bk-Fine1 | 4 passes | 16 nozzles for black | 6.51KHz [6.51KHz (13.02KHz)] |
| Bk-Fine2 | 4 passes | 32 nozzles | 6.51KHz [6.51KHz (13.02KHz)] |
| Bk-HS | 1 pass | 64 nozzles for black | 9.19KHz |
| Color-HQ1 | 1 pass | Switches automatically between 24 or 64 nozzles | 6.51KHz [4.88KHz (9.76KHz)] |
| Color-HQ2 | 1 pass | Switches automatically between 24, or 64 nozzles*2 | 6.51KHz [4.88KHz (9.76KHz)] |
| Color-Fine1 | 3 passes | 8 nozzles | 6.51KHz [6.51KHz (13.02KHz)] |
| Color-Fine2 | 3 passes | 8 nozzles | 6.51KHz [6.51KHz (13.02KHz)] |
| Color-HS | 1 pass | Switches automatically between 24 or 64 nozzles | 9.19KHz |

### With a Photo BJ Cartridge

| Printing Mode | Carriage Movement | Number of Nozzles | Heat Frequency [*1] |
|---|---|---|---|
| Bk-HQ | 1 pass | 64 nozzles for black | 6.51KHz [6.51KHz (13.02KHz)] |
| Bk-Fine1 | 4 passes | 16 nozzles for black | 6.51KHz [5.21KHz (10.42KHz)] |
| Bk-Fine2 | 4 passes | 32 nozzles | 6.51KHz [5.21KHz (10.42KHz)] |
| Bk-HS | 1 pass | 64 nozzles for black | 9.19KHz |
| Color-HQ1 | 1 pass | Switches automatically between 24 or 64 nozzles | 6.51KHz [4.88KHz (9.76KHz)] |
| Color-HQ2 | 1 pass | Switches automatically between 24, or 64 nozzles*2 | 6.51KHz [4.88KHz (9.76KHz)] |
| Color-Fine1 | 3 passes | 8 nozzles | 6.51KHz [5.21KHz (10.42KHz)] |
| Color-Fine2 | 3 passes | 8 nozzles | 6.51KHz [5.21KHz (10.42KHz)] |
| Color-HS | 1 pass | Switches automatically between 24 or 64 nozzles | 9.19KHz |

*1 [ ]: Carriage speed (heat frequency) for 720 dpi printing/smoothing.

*2 When the print resolution is 720 dpi, processing to prevent colors running at the borders is not executed.

## 2.8 Optimum Printing Direction Control

To prevent vertical misalignment of the printed characters, etc., when printing data is printed continuously in the direction of the paper feeding direction, printing is executed with the carriage moving from only one direction.

However, when the printing in the paper feeding direction is not continuous, since vertical misalignment is not so noticeable the printing direction is alternated so that printing is also executed from the opposite carriage direction. This improves the throughput.

If four or more successive null rasters are detected in the lower (in the direction of paper ejection) 64 nozzles (24 nozzles with a color BJ cartridge) for the printing data in the printer buffer during single-pass printing, printing is executed up to the null raster. From the null raster onward, the printing is executed from the opposite carriage direction. From the next raster onward, the printing is executed from the same carriage direction until the direction changes again.

## 2.9 Ink Smear Control

Immediately after the printed sheet is ejected from the printer, the ink dries naturally on the Paper output tray. If the next printed sheet is ejected before the ink dries on the preceding sheet on the Paper output tray, the ink may be smeared when the sheet slides over the preceding one. To prevent this, a wait is applied during the printing so that the sheet is ejected with a delay, giving more time for the ink on the preceding sheet to dry.

When a black BJ cartridge is used (whose printing speed is faster) and high duty printing is completed, the printer automatically detects the printing position of the high duty printing and the time elapsed from which the printing starts.

It is not need to execute ink smear control when a color BJ cartridge is used.

## 2.10 Bi-Centronics Interface

The Bi-Centronics interface is supported to maintain upward compatibility with the conventional Centronics interface and implement bi-directional communication.
MultiPASS C3000 supports three interface modes: Compatibility, Nibble and ECP modes which conform to IEEE-P1284 D2.00 Sep. 10, 1993.

### 2.10.1 Functions

**a) Centronics uni-directional Interface (Compatibility mode)**

If the facsimile is used as a printer for an MS-DOS application, select #6 DOS PRINTING menu so that the facsimile switches to the printer mode and the Centronics interface is available for uni-directional printing.
By default, it works with IBM Proprinter X24E (BJ mode) compatible machines, but can be configured to work with Epson LQ-2550 compatible machines, by BJ Setup Utility program.

**b) Bi-Centronics Interface (Nibble mode)**

If the printer mode is off, the Bi-Centronics interface is selected and the functions mentioned below can be used with the MultiPASS Desktop manager software under MS-Windows or Windows 95.

**(1) Sending**

Data from the computer can be sent by facsimile.

**(2) Receiving**

Received facsimile data can be sent to the computer.

**(3) Scanning**

Documents can be scanned into the computer.

**(4) Telephone dialing**

Telephone dialing from the computer.

**(5) Printing**

Data from the computer can be printed by facsimile.
If printing is performed under MS-Windows® or Windows 95®, set #6 DOS PRINTING menu to OFF.
The facsimile is switched to the printer mode and printing is started by sending commands from the printer driver instead of using the #6 DOS PRINTING. The printer mode is canceled after printing.

**NOTE**

When the “PRINTER MODE” is displayed, the user cannot carry out some operations (such as registration, manual transmission and reception). When operating from an MS-Windows® or Windows 95® application, if #6 DOS PRINTING is ON, a warning flashes on screen, every few seconds.

**REFERENCE**

For details of the MultiPASS utility, see *the Desktop manager for Windows Service Manual* or *User's Guide*.

## 2.10.2 Structure

### a) Centronics uni-directional interface (Compatibility mode)

See *Part 2: Printer, Chapter 1: 2.2 Interface Specifications on page 1-5*.

### b) Bi-Centronics Interface (Nibble mode)

In Nibble mode, the host computer sends data to the facsimile using the 8-bit data line as used for the Centronics interface. However, the facsimile transfers data to the host computer using the four status signal lines by dividing 8-bit data into 4 bits and sending them.

#### b-1) Pin Assignment

The following table lists the signals and input/output status of the pin assignments used for parallel communication.

| *No.* | *Signal* | *I/O* | *No.* | *Signal* | *I/O* |
|---|---|---|---|---|---|
| 1 | (STROBE) HOSTCLK | IN | 19 | STROBE-RET | |
| 2 | (DATA 1) | IN/OUT | 20 | DATA 1-RET | |
| 3 | (DATA 2) | IN/OUT | 21 | DATA 2-RET | |
| 4 | (DATA 3) | IN/OUT | 22 | DATA 3-RET | |
| 5 | (DATA 4) | IN/OUT | 23 | DATA 4-RET | |
| 6 | (DATA 5) | IN/OUT | 24 | DATA 5-RET | |
| 7 | (DATA 6) | IN/OUT | 25 | DATA 6-RET | |
| 8 | (DATA 7) | IN/OUT | 26 | DATA 7-RET | |
| 9 | (DATA 8) | IN/OUT | 27 | DATA 8-RET | |
| 10 | $\overline{\text{(ACKNLG)}}$ PTRCLK | OUT | 28 | $\overline{\text{ACKNLG}}$-RET | |
| 11 | (BUSY) PTRBUSY | OUT | 29 | BUSY-RET | |
| 12 | (P.E.) ACK DATA REQ | OUT | 30 | PAPER END-RET | |
| 13 | $\overline{\text{(SELECT) xflog}}$ | OUT | 31 | $\overline{\text{INIT}}$ | IN |
| 14 | $\overline{\text{(AUTO FEED XT}^{2}\text{)}}$ HOST BUSY | | 32 | $\overline{\text{ERROR}}$ DATA AVAILABLE | OUT |
| 15 | NO CONNECTION | | 33 | GND | |
| 16 | GND | | 34 | NO CONNECTION | |
| 17 | GND | | 35 | +5.0V[3] | OUT |
| 18 | PERIPHERAL LOGIC HIGH[4] | | 36 | $\overline{\text{SELECT IN}^{2}}$ | |

1 All RETs are connected to GND.

2 These signals are valid only in Epson LQ printer control mode.

3 The level is raised to +5.0V at 3.3kΩ register.

4 The level is raised to +5V at 390Ω register.

**b-2) Data transfer from the facsimile to the host computer in Nibble mode**

Data is transferred by the following steps.

The host computer sets HostBusy to low to indicate that it is ready to receive data (①).
The facsimile sets the low-order nibble of the byte (0 to 3 bits) to four lines: nDataAvail, Xflag, AckDataReq, and PtrBusy. (These lines are the reverse channel data lines.)(②).
The facsimile sets PtrClk to low (③), and the host computer receives data (0 to 3 bits).
The host computer sets HostBusy to high to notify the facsimile that the computer has received data (④).
The facsimile sets PtrClk to high to end the data (0 to 3 bits) transfer (⑤).
The host computer sets HostBusy to low to receive the data (4 to 7 bits) (⑥).
4 to 7 bits data transfer is carried out as same as 0 to 3 bits transfer and 1 bite transfer completes (②' ~ ④').
If the next byte can be transferred, the facsimile sets nDataAvail to low (⑦), and PtrClk to High to responds to host's receipt (⑤').

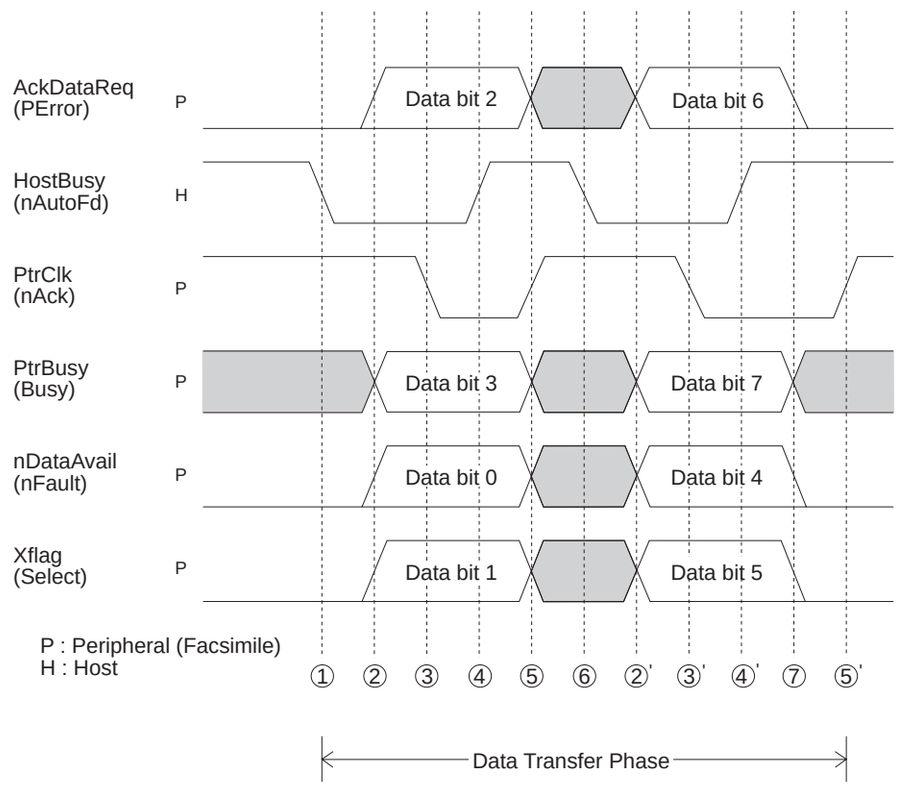



**Figure 2-6 Nibble Mode Facsimile to Host Data Transfer**

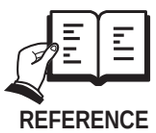
**NOTE**

Some types of host computers use a mode other than the Bi-Centronics interface Nibble mode as default. In this case, the host computer must be set to Nibble mode. Check the host computer specifications and change the print mode if necessary. The Nibble mode is specified in the IEEE-P1284 standard, but it may be called differently STD, Uni-Direction, Compatible, AT, etc. For some computers.

**c) Bi-Centronics Interface (ECP mode)**

If the host computer supports ECP mode, your MultiPASS unit transfers data in ECP mode. If the host computer does not support ECP mode, your MultiPASS unit transfers data in Compatibility mode and Nibble mode. ECP mode must be set for some host computers. ECP stands for Extended Compatibility Port. Data can be transferred at high speed in ECP mode. In this mode, data can be transferred more quickly than in Nibble mode because 8-bit data lines are used bi-directionally without changing the mode. Optionally, data can be compressed and transferred.

# 1. MAINTENANCE LIST
# 2. HOW TO CLEAN PARTS
# 3. ADJUSTMENT




See *Part 1: Facsimile, Chapter 3: Maintenance & Service*, for details.

# 4. TROUBLESHOOTING

This section contains information to help you solve printer problems. A problem may have one or a combination of causes, including a malfunction in your computer, software, the printer cable, or the printer. Many printing problems are related to how your software interacts with the printer.
If your printer is not operating properly, try the suggestions in this section.

REFERENCE

Also, you should see *Part 1: Facsimile, Chapter 3: 4. TROUBLESHOOTING*, for details.

## 4.1 Errors Shown on the Display

### 4.1.1 User error message

REFERENCE

See *Part 1: Facsimile, Chapter 3: 4.2.1 User error message* for details.

### 4.1.2 Error codes

REFERENCE

See *Part1: Facsimile, Chapter 3: 4.2.2 Error codes* for details.

## 4.2 Errors not Shown on the Display

See *Part 1: Facsimile, Chapter 3: 4.3 Errors not Shown on the LCD* in the general symptom/cure chart.

### a) Operational problems

**Printer does not print**

If the printer is turned on, but it still does not print, there is a problem either with the printer or its communication with your computer. Follow these steps to determine the problem:

**Solutions:**
(1) Check the interface cable connection. Make sure you have connected the correct interface cable to your computer, and that the connections are secure.
(2) Make sure that paper is loaded properly from the auto sheet feeder.
(3) Run one of the test prints described in *Part 1: Facsimile, Chapter 3: 6. TEST FUNCTIONS*. If this prints, the problem is in the communication between the printer and your computer.
(4) Make sure that the computer is set up correctly for your printer (Printer driver and output interface port).
(5) Print a screen dump from your computer. If it still does not print, there is a problem with your software, or your interface port.

### b) Paper pickup/eject error

**Paper is not picked up from the auto sheet feeder**

**Solutions:**
(1) Check whether the recommended paper is in use.
(2) If the problem is not cleared, make sure the display indicates **"PRINTER MODE"**, and then press the *RESUME* button.
(3) If the paper is loaded, make sure that the computer is set up correctly for your printer. (Printer driver and output interface port)
If the printer cannot load paper, see *Part 1: Facsimile, Chapter 3: 4. TROUBLESHOOTING*.

**Paper does not eject after printing**

**Solutions:** Most software applications tell the printer to eject the paper after printing, however, some do not. If the printer does not automatically eject a sheet of paper after printing, press the *RESUME* button to eject the paper.

### c) Print quality problems

If your print quality is not what you expect it to be, check the following list for your problem and a possible remedy or locate the problem in the sections below.

| Print results | Most probable cause | Remedy |
|---|---|---|
| Smudged | Paper type | Try a different paper type |
| Blurred | Paper type | Try a different paper type |
| Fading | Print head is clogged or out of ink | Clean the print head or replace the ink cartridge |
| White streaks | Print head is clogged | Clean the print head |
| Dots missing | Print head is clogged | Clean the print head |
| Irregular dots | Print head is clogged | Clean the print head |

#### Print density is low

**Solutions:** (1) If you use Windows®, open the option window in the printer setup window. Then, set the intensity control slide bar to a darker position.

#### Characters appear jagged

**Solution:** Check your software application to see what resolution is selected. Printing at 180 dpi or less will give a jagged look to the output. Changing the resolution to 360 or 720 dpi should correct this.

#### Ink stained areas

**Solution:** If you use the Windows®, open the option window in the printer setup window. Then, set the intensity control slide bar to a lighter position.

### d) Printing problems

This section contains problems and solutions related to your printer or the software you are using.

#### Printing beyond the edge of the page

If the printer is printing only part of each line, follow these steps:

**Solutions:** (1) Make sure the paper is aligned correctly in the auto sheet feeder.
(2) Check the software setting for the right margin.
(3) Check the **"FAX PRINTER SETTING"** of user data in the facsimile mode. The **"SELECT PAPER SIZE"** item controls the horizontal print position.

#### Computer indicates a device time-out

A device time-out occurs when your computer sends data to the printer but the printer does not respond. The printer may be off, not printer mode, or not connected to the computer.
If your computer indicates a device time-out, follow these steps:

**Solutions:** (1) Make sure the printer function is on.
(2) Make sure the printer's interface cable is securely attached to both the printer and the computer.
(3) Make sure paper is properly loaded in the automatic sheet feeder.
(4) Try the print operation again.

# 5. SERVICE OPERATION FUNCTION

## 5.1 Report Output Function

There is no automatically report output for printer mode.

## 5.2 Service Data

There is no service data setting for printer mode.

REFERENCE

For details on Printer mechanism service data setting, see *Part 1: Facsimile, Chapter 3: 5.2 Service Data Setting on page 3-33*.

## 5.3 Test Functions

### 5.3.1 User test functions

REFERENCE

For details on User Test Functions, see *Part 1: Facsimile, Chapter 3: 6.1 User Test Print Functions on page 3-43*.

### 5.3.2 Hexadecimal dump print

You can set the printer so that it prints the hexadecimal code data. Then, when the printer receives print data from the computer, it converts and prints in the hexadecimal code.

You only need to set this function if you decode the print data from an application program that does not send the print data correctly.

In this mode, each byte of data from the computer is printed as hexadecimal data in units of 16 bytes per line. Remaining data less than one line long are printed when the printer mode is finished.

In order to output the hexadecimal dump print, you have to change the service data switch settings in facsimile mode. In Service data – #7 PRINTER – 5. HEX DUMP MODE, select Yes = (*), then, when printer mode is entered, by selecting #6 DOS PRINTING with the *SPECIAL MODE*, a hexadecimal dump print is output.

To stop the hexadecimal dump print select the #6 DOS PRINTING again, and go back to facsimile mode, and select #7 PRINTER – 5. HEX. DUMP MODE No = (#). Then, when you return to the printer mode, normal printing is resumed.

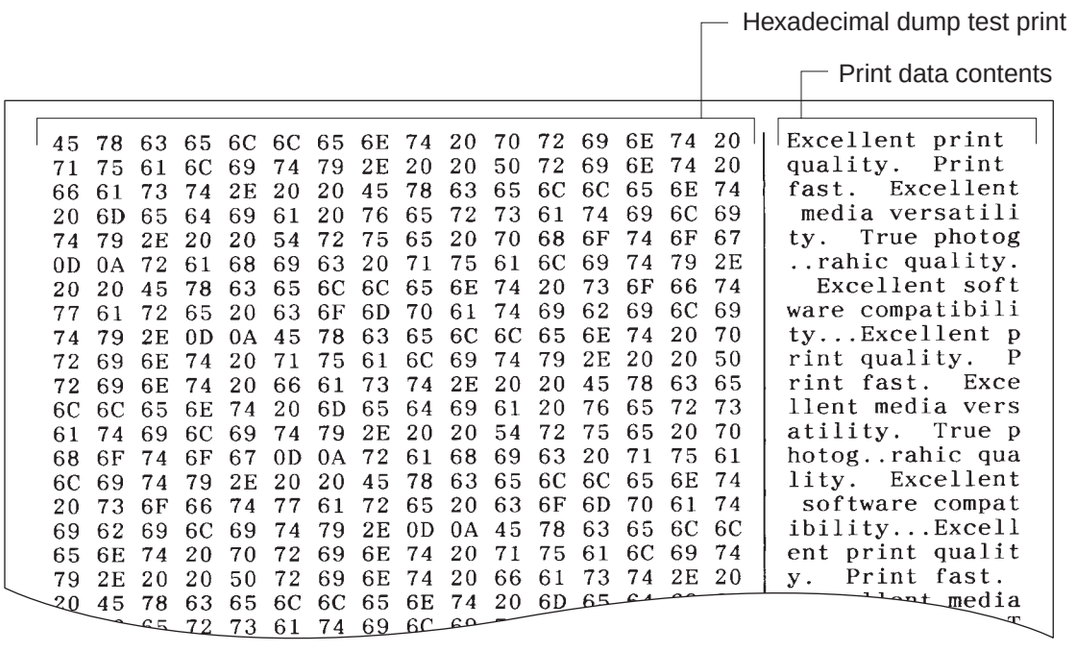



**Figure 3-1 Hexadecimal Dump Print (Sample)**

# 6. WIRING DIAGRAM

## 6.1 Wiring Diagram

REFERENCE

See *Part 1: Facsimile, Chapter 3: 7. WIRING DIAGRAM* in the general wiring diagram.

## 6.2 Connector Location and Signal Description

### 6.2.1 SCNT board

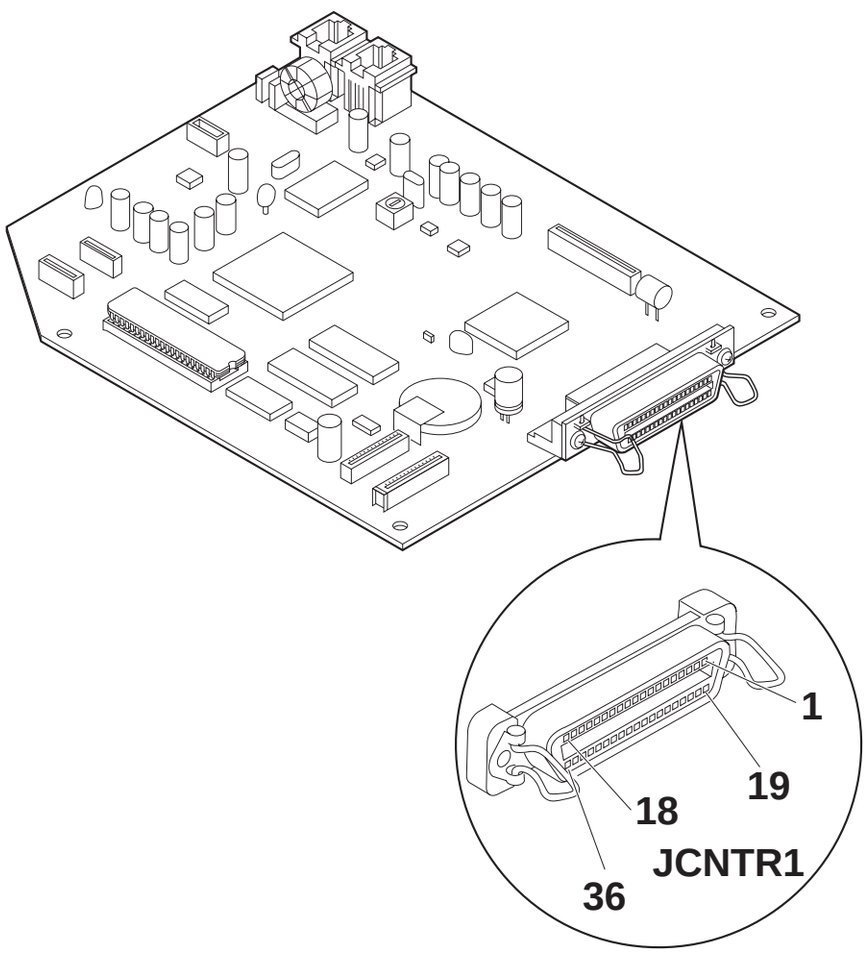



**Figure 3-2 SCNT Board**

**JCNTR1 (Centronics connector in ECP mode)**

| Pin No. | Signal | In/Out | Source | Description |
|---|---|---|---|---|
| 1 | STB* | IN | Computer | *1 |
| 2 | DATA0 | IN/OUT | Computer | Data bus |
| 3 | DATA1 | IN/OUT | Computer | Data bus |
| 4 | DATA2 | IN/OUT | Computer | Data bus |
| 5 | DATA3 | IN/OUT | Computer | Data bus |
| 6 | DATA4 | IN/OUT | Computer | Data bus |
| 7 | DATA5 | IN/OUT | Computer | Data bus |
| 8 | DATA6 | IN/OUT | Computer | Data bus |
| 9 | DATA7 | IN/OUT | Computer | Data bus |
| 10 | ACK* | OUT | --- | *2 |
| 11 | BUSY | OUT | PCNT board (IC5) | *3 |
| 12 | PE | OUT | PCNT board (IC5) | *4 |
| 13 | SELECT | OUT | PCNT board (IC5) | *5 |
| 14 | AFXT* | IN | Computer | *6 |
| 15 | Not used | | | |
| 16 | GND | --- | --- | Ground |
| 17 | GND | --- | --- | Ground |
| 18 | +5.0V | OUT | Power supply | Power ON Signal |
| 19 | GND | --- | --- | Ground |
| 20 | GND | --- | --- | Ground |
| 21 | GND | --- | --- | Ground |
| 22 | GND | --- | --- | Ground |
| 23 | GND | --- | --- | Ground |
| 24 | GND | --- | --- | Ground |
| 25 | GND | --- | --- | Ground |
| 26 | GND | --- | --- | Ground |
| 27 | GND | --- | --- | Ground |
| 28 | GND | --- | --- | Ground |
| 29 | GND | --- | --- | Ground |
| 30 | GND | --- | --- | Ground |
| 31 | INIT* | IN | Computer | *7 |
| 32 | FAULT* | OUT | PCNT board (IC5) | Printer interrupt signal |
| 33 | GND | --- | --- | Ground |
| 34 | Not used | | | |
| 35 | +5.0V | OUT | Power supply | Peripheral |
| 36 | SELECTIN* | IN | Computer | -SLCT IN |

*1 Data transmission synchronizing signal (Forward direction)
*2 Data transmission synchronizing signal (Reverse direction)
*3 Data reception completion signal (Forward direction)
*4 Data transmission direction change response signal
*5 Extension request response signal
*6 Data reception completion signal (Reverse direction)
*7 Data transmission direction change request signal

# 1. INSTALLATION

This section describes the steps you follow to set up the printer.

NOTE

- When installing the printer, you must complete the fax installation described in Part 1.
- No Centronics-compatible, parallel interface cable is provided with this fax package. Therefore, you must obtain an interface cable for connecting to the computer.

**Contents**

**1.1 Choosing a Location for the Printer**
**1.2 Connecting the Printer to the Computer**

REFERENCE

For details of printer driver installation and default settings, see the *User's Guide*.

## 1.1 Choosing a Location for the Printer

Whether at home or in the office, you need to find a comfortable and convenient location for the printer. However, the maximum length of the interface cable must be approximately 2.0m (6.5 feet).

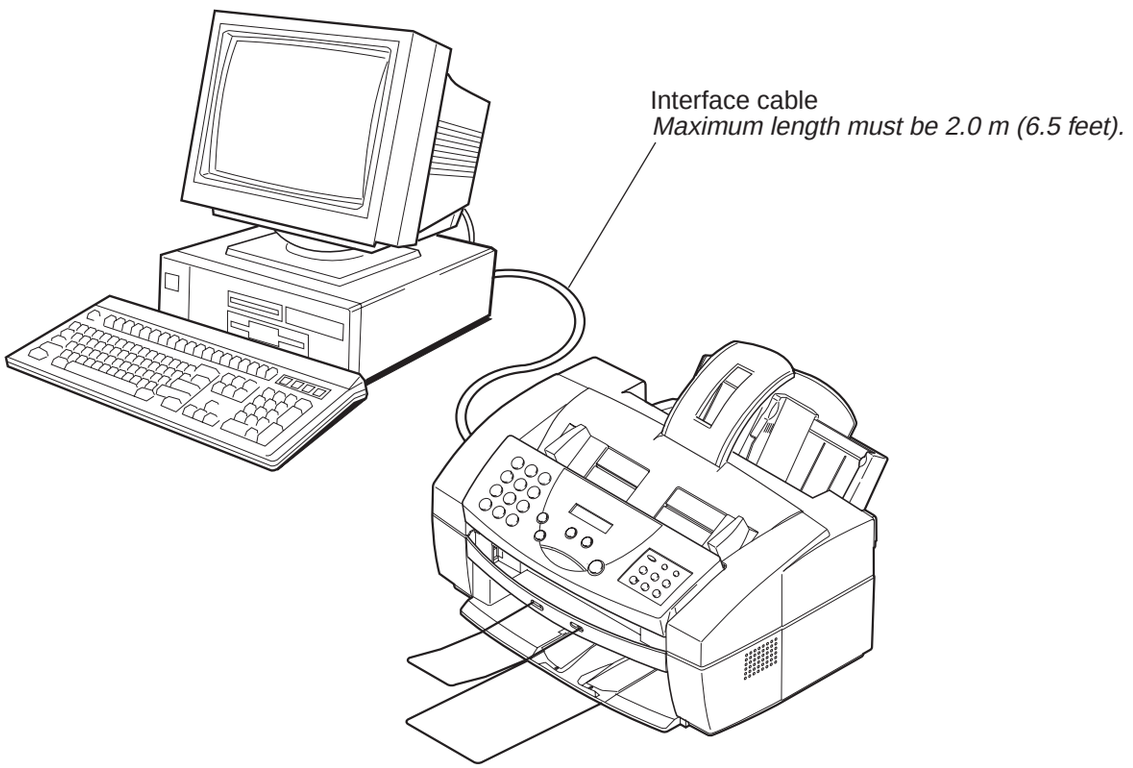



**Figure 4-1 Location for the Printer**

## 1.2 Connecting the Printer to the Computer

(1) Make sure the computer is powered off.
(2) Make sure the fax outlet is pulled out to turn off the power.
(3) Align the cable connector with the printer's parallel interface connecter so the shapes match. Gently press the cable connector into the printer's connector.
(4) Secure the cable connector by snapping the two wire clips (located on the printer) into the cable connector.
(5) Connect the other end of the interface cable to the parallel port on the computer.

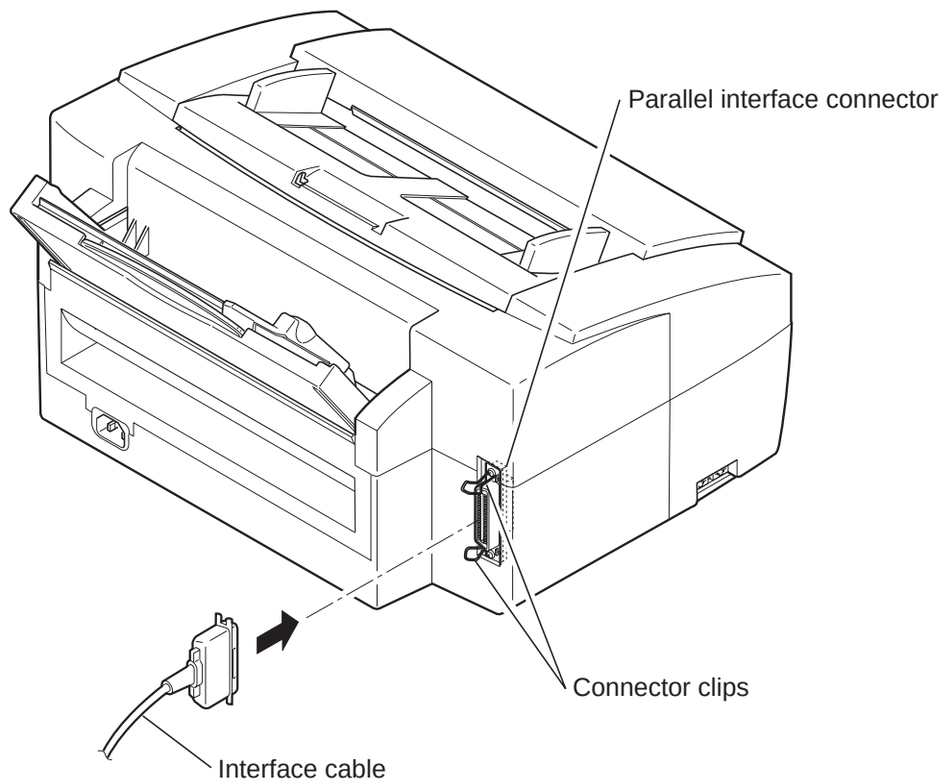



**Figure 4-2 Connecting the Interface Cable**